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FLORA

AND SYLVA.

A Monthly Review for Lovers of Garden, Woodland, Tree or Flower; New and Rare Plants, Trees, Shrubs, and Fruits; the Garden Beautiful, Home Woods, and Home Landscape. Edited by, and Printed and Published for, W. Robinson, Author of "The English Flower Garden," "Alpine Flowers for Gardens," and "The Wild Garden."

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VOL. III.

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1905.

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To the Memory of
H. G. Moon, Painter of Flowers and of Landscape,
this Volume of Flora and Sylva is Dedicated.

"*Yet how æsthetic is Nature! Every spot that is entirely uncultivated and wild, however small it may be, if only the hand of man remains absent, it clothes itself with plants, flowers and shrubs, whose unforced nature and natural grace bear witness that they have not grown up under the rod of correction of the great egoist, but that Nature has here moved freely. Upon this rests the principle of the English garden, which is to conceal Art, so that it may appear as if Nature had here moved freely; for only then is it perfectly beautiful.*

* * * * * *

The great difference between the English garden and the old French, which still exists in a few magnificent examples, ultimately rests upon the fact that the former is planned in an objective spirit, the latter is a subjective. In the former the will of Nature, as it reveals itself in tree and shrub, mountain and waterfall, is brought to the purest possible expression of these its Ideas, thus of its own inner being. In the French garden, on the other hand, only the will of the possessor of it is mirrored, which has subdued Nature, so that instead of its Ideas it bears as tokens of its slavery the forms which correspond to that will, and which are forcibly imposed upon it—clipped hedges, trees cut into all kinds of forms, straight alleys, and arched avenues."—ARTHUR SCHOPENHAUER.

FLORA

Vol. III. No. 22.] JANUARY, 1905 [Monthly.

THE EVIL INFLUENCE OF FRUIT SHOWS AND "ELECTIONS."

OWNERS of gardens should exercise pressure on their gardeners to induce them to think of the quality of fruit. There are various influences adverse to this. Fat catalogues are against us in giving a far larger number of kinds than anyone wants (forty where ten would do), and adding new kinds every year, soft, early-rotting, and useless varieties. Another bad influence is in the elections of fruit sent to journals. Gardeners return lists of fruits that they admire and cultivate, and most of them enumerate fruits of no quality. Lately an election of dessert Apples was organised by a weekly journal, and some of the worst flavoured Apples came out at the head of the poll, such as *Worcester Pearmaine* and *King of Pippins*.

It is usually impossible for a gardener to give any right attention to the best fruit if burdened with a great number of kinds, of which he may not always know the names. Kinds differ in their wants, and if we have enough of a first-rate fruit it is worth while to study its wants as to pruning, vermin, canker, and the like, which often spoil the crop. Some of the popular kinds, of poor quality, are not so liable to fail from these causes; but if we want a crop of the finer kinds—say, *Ribstone Pippin*—it is necessary to keep the trees free of bug and canker from their youth, and we now possess means to that end. This is much more easily done if there be a sufficient number of the good kinds to make the work worth doing. The colonial and American growers look well to this, and fix their minds on first-rate kinds, such as are readily saleable in the London and American markets, and the necessary care is given to the trees. Whether our own people grow enough Apples of the best kinds or not, does not much matter to the general public, because good Apples are now seen in such quantities upon the markets that anybody knowing a good Apple can usually get it. Eventually, the knowledge of these fine flavoured Apples will reach to the mass of the people, so that there will be little chance for kinds of poor quality. Another very unwise thing which works harm is the division of Apples into cooking and eating sorts, an arbitrary ruling and one of the many evil results of the mania for needless distinctions. The only classification worth notice is that into good and bad sorts; the best eating Apples (called "dessert Apples" in the planters' lists), in nine cases out of ten, are the best for cooking, such as the *Blenheim*, *Newtown*, *Calville blanc*, *Darcy Spice*, *Ribstone* — when well grown, and every other first-rate eating Apple. They differ a little in quality for the cook, but no one who knows them in cookery would ever again use an ill-flavoured Apple for this purpose.

One of the great gains in cooking a first-rate Apple is that it finds its own sugar, as in the case of the *Blenheim*, *Newtown*, and *Spitzbergen*. Sour and bad Apples that must be cooked with doses of manufactured sugar, lose a great part of their food value, and are often not wholesome. Certainly some of these first-rate Apples have not been common, and some might think them too dear for cooking; but this condition is becoming every day changed since the colonial and American growers raise only first-class Apples, and attend to their culture in the best state; these good Apples are now coming into our markets in increasing quantities, and promise to be so abundant that all can afford them. The *Newtown*, which at one time came only from Virginia in limited quantities, is now planted over a vast region in Oregon and other states, and is coming to our markets so freely that it can be used in all ways. In the face of such facts, why grow any but the best kinds at home? Showing a great number of kinds of Apple, late in winter or at a spring show when many of them are out of their true season, has also a bad effect. Though carefully preserved so far as their skins go, if tasted, these fruits are without quality, but seeing them, the public are led to plant kinds of no value.

In the great fruit shows of the year the classes for Pears (one of our most important fruits) were made up very largely of big showy kinds, easy to grow but of poor quality, such as *Durondeau*, *Pitmaston Duchess*, and *Beurré Clairgeau*. Not only are these poor in themselves, but they take up the space that ought to be given to really good kinds, for which the climate of our country is suited: Pears like *Marie Louise* and *Winter Nelis*. Pears do not come in first-rate quality to our markets except in small lots, and it behoves private growers, therefore, to grow more of the best Pears. We in Britain, if our kinds are well chosen, can grow some of the best flavoured Pears; it is wasting space to attempt any others. From what I saw in Belgium during the present year, I think a beautiful extension of Pear culture might be made by growing them as standard trees, always on the Pear stock, not on the Quince. By taking hardy kinds that ripen well in our country when grown as standards, we could be sure of their forming useful trees. Such varieties on a wall are difficult to keep within bounds, and many kinds suited for our country do not live long on the Quince. Pear-trees as standards are often beautiful to see, and the flavour of the fruit, when we get it, is in some cases finer than that from walls. A very close and rigid choice of Pears as regards flavour and hardiness, and the stocks they do best on, is very necessary ; because whilst the flavour of a poor Apple can be improved by adding sugar, spice, quince, etc., the Pear is usually judged by its own quality.

ROSE NOTES FROM WESTERN NEW YORK.

Madame C. P. Strassheim, an extremely refined cream-coloured flower with peach-coloured outer petals, is still blooming finely with me at the end of October. In growth, foliage, freedom, and beauty of flower, it takes rank with the very finest of the Teas. Among the best Roses I have flowered is *Lady Henry Grosvenor;* apart from its beauty it stands the rain and the frost as no other out-of-door Rose does. *Christine de Noué*, which you revile, is a rich-toned red in the summer with me, and a charming autumn bloomer. *General Gallieni* is unique, supplying a new note to the gamut of reds. *Francis Dubreuil*, with its strong distinct scent of ripe Apples, has been very fine this season ; and *André Schwartz* is not far behind in free-flowering qualities and richness of tone. But the most brilliant note of red is struck by the hybrid-tea, *Marquise Litta de Breteuil*—a veritable torch in the garden. And what a deliciously perfumed sachet she carries! *Madame Jules Grolez* has proved most satisfactory as a brilliant and showy Rose. *Hélène Cambier*, too, has been exquisite throughout the season, and what a fragrance she disburses, similar to *Malmaison*, *Madame Wagram Comtesse de Turenne*, and *Reine Nathalie de Serbie*. *Frau Geheimrath von Boch* has a lovely complexion, but no physique. The new hybrid-tea, *Königin Carola*, is a wonder for the size of its rich rose blooms. *Madame Jean Dupuy* promises better than *Franziska Krüger*. *Friedrich Harms* and *Prince de Bulgarie* are superb, and so are *Prince Theodore Galitzine*, *Princess Beatrix*, *Madame Derepas-Matrat*, and numerous others among the golden and orange beauties, not forgetting *Alliance Franco-Russe*, *Mdlle. Jeanne Philippe*, and *Mdlle. Pauline Bersez*. *Jeanne Guillaumez* has been most beautiful this year, and I cannot say too much of *Archduchesse Marie Immaculata* as an autumn flower. Both are deliciously fragrant. *Eliza Fugier* has been a delight in fragrance, form, foliage, growth, and profuse bloom. *Elaine Greffülhe* is a gem among the whites. *Madame Ravary*, as you say, is a charmer worth knowing, though with her away one could pass the time right merrily with *Hofgartendirektor Gräbener*, and scarcely know the difference. Of course it will never do to forget *Dr. Grill*, *Anna Ollivier*, *Marie van Houtte*, *Madame Hoste*, *Madame Lombard*, *Hon. Edith Gifford*, *Gloire de Dijon*, and the rest of our good old friends. *Comtesse Antoine d'Oultremont* I love for its briar fragrance and its very free-blooming qualities. I may say the same of *Kronprinzessin Victoria* among the whites in a different class. *Gardenia* likewise has proven very satisfactory, but what can excel *Kaiserin Aug. Victoria* among the pale beauties! *Edmée Metz*, *Ferdinand Jamin*, *Madame Errera*, *Eugenie Boullet*, *Madame Vermorel*, *Mildred Grant*, *Beauté Inconstante*, *Perle de Feu*, *Souvenir de Pierre Notting*, *Apotheker Georg Höfer*, and how many, many more grace their place in the garden. *Souvenir de Catherine Guillot* remains as beautiful as your old coloured print of her in "The Garden." On the other hand, *S. de Lady Ashburton* is absolutely worthless with me after two trials;—a poor grower, and with a tendency to split. *Comte de Sembui* is as bad, although a vigorous grower, and always "balls," and so does *Etoile de Lyon.* Half-standards I am not as pleased with as with standards, for Roses with any strength of growth have a tendency to expend their vigour in one or two ungainly shoots. As a general rule, I try only good strong growers, keeping the climbers by themselves and arching them over. Teas, and the tender hybrid-teas are extremely difficult to grow successfully in our climate, unless in quite small beds. The thing is to know the way of wintering them, damp being more destructive than frost. My plants have the highest, most minutely careful cultivation it is possible to give—and I reap the reward. The thrip is our worst enemy to combat out-of-doors, and I have never yet discovered a catholicon that will banish him. The misnamed hybrid-perpetuals are unsatisfactory, with their short season of bloom and their long, ungainly shoots. The new hybrid-perpetual *Louis Richard* is a beauty, however. One of your new English hybrid-teas, *Lady Moyra Beauclerc*, has proved very satisfactory, and so has *Gladys Harkness*. Why do people plant such sorts as *Hermosa*, and *Clothilde Soupert*, with its muddy outer petals, when there is such a galaxy to choose from? *Madame J. P. Soupert* is a splendid white among the hybrid-teas, but it does not always open well. *Bessie Brown* is grand; *Lady Clanmorris* has too much of the "Annie Laurie" neck. *Aimée Cochet*, *Madame Moreau*, *Antoine Rivoire*, *Souvenir du Président Carnot*, *Comtesse de Breteuil*, *Lady Mary Fitzwilliam*, *Madame Cusin*, *Souvenir of Wooten*, *Liberty*, and *Grace Darling*, are all fine with me. *Grüss an Teplitz* grows too rank; *Meta* is a small, drooping, non-lasting flower; while *Souvenir de Jeanne Cabaud*, *S. de Victor Hugo*, and *S. de Gabrielle Drevet*, are too weak-necked, and the flowers split badly in the two first named. *Souvenir d'un Ami*, too, always hangs its head and has no distinct colour, so I have rejected it. *Conrad Strassheim* is very fine, while among the polyanthas, those I like best are *Anna Marie de Montravel*, *Comtesse Antoine d'Oultremont*, *Miniature*, and *Perle d'Or*.

GEORGE H. ELLWANGER.
Rochester, New York.

The Trailing Arbutus (*Epigæa repens*).—On this 10th day of April I have been out on the hills near Elmira, to see what is going on among the citizens of the vegetable kingdom. The ground was white in spots with half-melted snow. A few whirls of snow had come down in the night, and the air was too cold to change it to rain. Some green leaves, in sheltered nooks, had accepted the advances of the sun, and were preparing for the summer. But that which I came to search after was the Trailing Arbutus, one of the most exquisite of all Nature's fondlings. I did not seek in vain. The hills were covered with it. Its gay whorls of buds peeped out from ruffles of snow, in the most charming beauty. Many blossoms, too, quite expanded, did I find, some pure white, and a few most delicately suffused with pink. For nearly an hour I wandered up and down, in pleasant fancies, searching, plucking, and arranging these most beautiful of all early blossoms. Who would suspect by the leaf what rare delicacy was to be in the blossom? Like some people of plain and hard exterior, but of sweet disposition, it was all the more pleasant from the surprise of contrast. All winter long this little thing must have slumbered with dreams, at least, of spring. It has waited for no pioneer or guide, but started of its own self, and led the way for all the flowers on this hillside. The odour of the flower is exquisite, and as delicate as the plant is modest. Some flowers seem determined to make an impression on you, stare at you, and dazzle your eyes. But this sweet nestler of the hills is so secluded, half covered with russet leaves, that you would not suspect its graces, did you not stoop to lift it up. If you smell it, at first it seems hardly to have an odour. But there steals out of it at length the finest, rarest scent, that rather excites desire than satisfies your sense.—Henry Ward Beecher.

THE GREATER TREES OF THE NORTHERN FOREST.—Constable's drawing of the Field Elm. Engraved on wood for Flora and Sylva.

We are happy to issue in this number an engraving of Constable's fine drawing of the Field Elm (from the South Kensington Museum), engraved with much skill for Flora and Sylva by M. Pochon. The story of Constable's life is too well known to need re-telling here, the main fact of it being that he was an artist of fine insight into nature, and among the first to render the whole effect of a landscape and its atmosphere. One of Constable's pictures went to Paris, and being seen by the young painter Corot, its influence grew in his mind, and led to some of the most beautiful landscape work ever painted by that great master. The account of the Field Elm is in our September issue of Flora and Sylva, Volume II., page 266.

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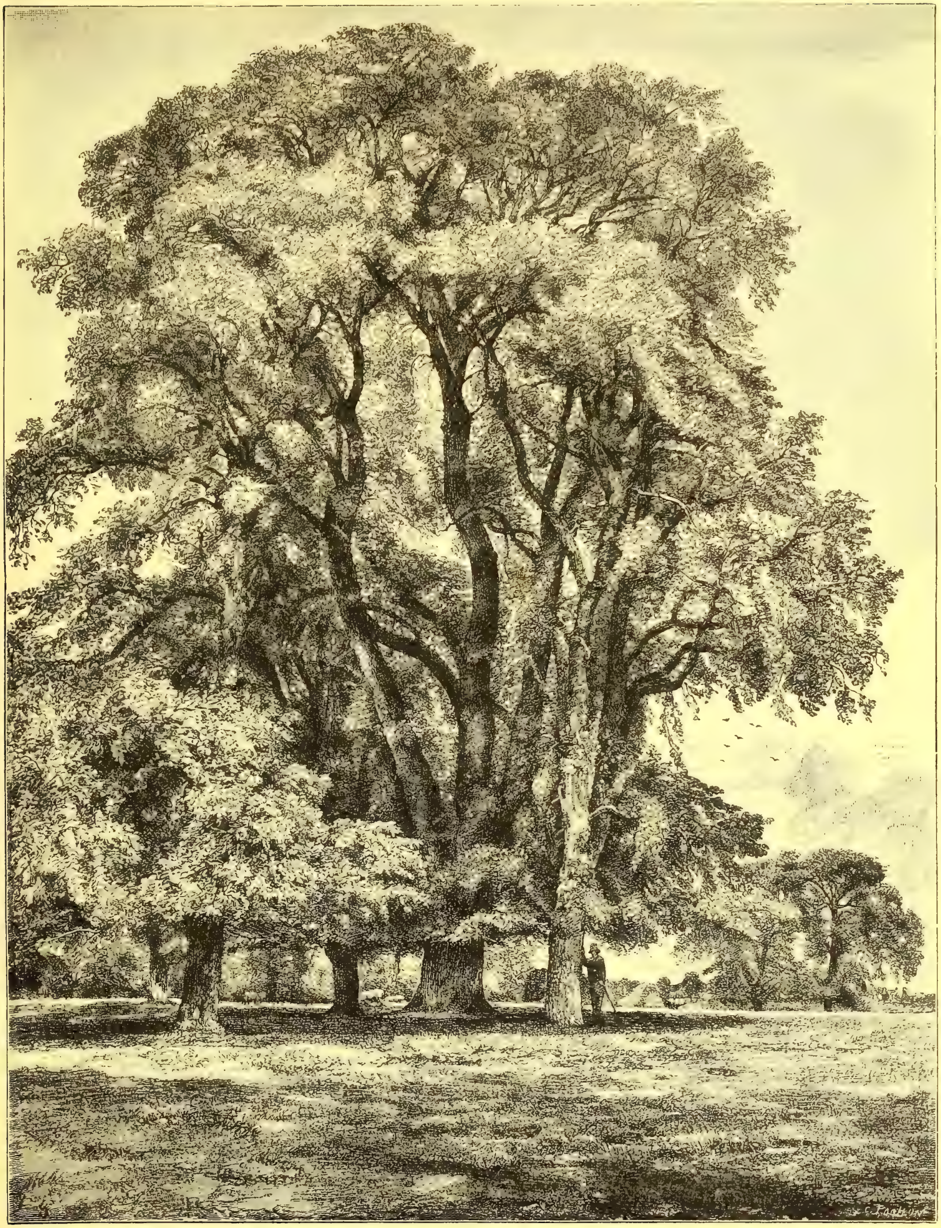


Group of Field Elms.

Engraved for "Flora" from a Drawing by John Constable.

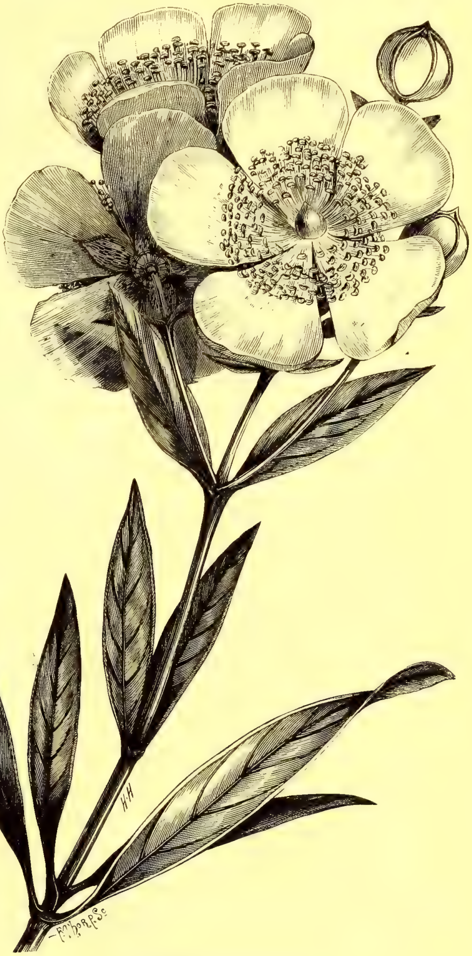
CARPENTERIA CALIFORNICA.

Scarcely twenty-five years have passed since this fine flowering evergreen first reached us as a rarity, even in its own country; for although discovered in the gorges of the Californian Sierra Nevada before 1850, it had remained so scarce that Asa Gray could only refer to imperfect fragments when publishing his description many years later. But, thanks to modern enterprise, it is now well known amongst us, and is fast becoming common in districts where it does well. In gardens of wet and heavy soil, the Carpenteria is never a success, stagnant moisture during winter being more fatal than cold; with its back to a wall, it will stand twenty degrees of frost almost unharmed, where lack of free drainage means failure. Where the needful conditions do not exist in the open, it may be grown in a cool house, forming bushy plants, and flowering freely in pots.

Our engraving gives a good idea of the large white flowers, with their cluster of yellow stamens, and mostly of 5 petals, though they are sometimes of 4 or 6, and more rarely semi-double, coming at the tips of the season's growth as clusters of 5 to 7, though sometimes they number as many as 12 blooms. In the greenhouse they open during April and May, and in the garden about six weeks later, with a fragrance of Mock-Orange flowers, and continued for several weeks. The leaves are light green above, smooth, or with a few scattered teeth upon the margin, and greyish-white with a close, felt-like down on their under surface. There are narrow and broader leaved forms, of which the first is the best, being hardier, and with more flowers of better shape. The leaf texture is delicate, and very liable to injury by red spider under glass, and by nipping winds in the open, giving them a brown and shrivelled look. Its habit is freely branching, and its growth rapid when well established; 10 feet is about its limit, but plants rarely reach this, often dying suddenly without apparent cause. It is well, therefore, to keep a reserve of young plants which may be raised from cuttings, layers, suckers, or seed. Well chosen cuttings root easily where others fail. They should be taken from the light side shoots, never from the stronger leaders, cut about 4 to 6 inches long, early in September, and put in pots of sandy soil in a cool frame, where they will root in about six weeks if kept close and shaded from hot sun. Suckers are freely given off by old plants, and should be detached during early autumn with all the root possible, choosing showery weather, and giving shade until established. Layers should be made at the same season, tongued, and a little sand and damp moss pressed into and over the wound; if watered carefully, they are sufficiently rooted to stand alone by the ensuing spring. Though not much used in this country, seed is a good way, and the first plants flowered in Europe were so raised. Good seed is sometimes ripened in our fine summers, and should be sown in spring.

The Carpenteria does well as a bush in Devon and Cornwall, the largest plant in England being probably one

8 feet high, and as much through, in a garden upon the banks of the Teign. In the main, however, it is best against walls, not closely trained, but near enough for shelter without the dry reflected heat in summer. A west or south-west aspect, avoiding fierce heat, is best in the south of England, though a sunny spot is necessary to well ripened shoots. While growing fairly well even upon chalk, a well-drained sandy loam or peat is best, and the protection of a mat in severe weather will secure it from harm, even into the milder parts of Scotland and the north of England—as at Melrose and in the Edinburgh Botanical Gardens. At places as far inland as Harrow, Sandhurst (Berks), Henley on Thames, and other places, it has proved hardy during many years, the plants in each case being 6 to 7 feet high — representing many years' growth — and quite unprotected in winter. One correspondent, indeed, reports his Carpenteria unharmed when Bays, Laurustinus, Euonymus, and Veronicas, suffered severely all around it. Even if touched by frost, the hurt seldom goes beyond the growing shoots and a temporary loss of leaf. Failure around London and other large cities is often due to smoke and fog, to which it is peculiarly sensitive. It is occasionally planted out against a greenhouse wall, but is much better in pots when under glass. The plants are so apt to get weary-looking and full of spider when wholly inside, that it is a great gain to be able to stand them out for a few months, the foliage freshening wonderfully under the copious autumn dews. Grown in large pots, they can be lifted in and out, they flower early, and are very handsome when several feet in height. B.



Carpenteria Californica.

SHORTIA GALACIFOLIA.*

It was in the winter of 1788 that Michaux first found this plant in the mountains of Carolina. His imperfect specimens lay for years unnoticed, until Asa Gray saw them in Michaux's herbarium in Paris, and, recognising in them an unknown plant, a search for it began, which ended only in the spring of 1877 with the finding of a tiny patch of plants a few feet square, upon the banks of the Catawba River in Dowell's County, North Carolina. Michaux was thus vindicated when many fruitless hunts had thrown doubt upon the plant's existence, and the first find of less than 100 tufts being soon scattered, the district was scoured, with the result that, though strictly local, the Shortia has proved less rare than at first supposed. It grows beneath trees in a light, moist soil of humus and leaf-mould, spreading as patches in the open thickets of *Magnolia cordata*, along with such little creepers as Mitchella, Asarum, and Galax, from which it takes its name. Plants of like nature, they are found together in colonies, and the strongly spreading Galax has even been blamed for the scarcity of the Shortia, for there is nothing else either in its habits or the conditions in which it is found, to explain its small area.

The Shortia grows in low tufts from 3 to 9 inches high, with shiny, evergreen leaves springing from a central crown, veined or marbled, and taking a rich red or bronze-purple colour in autumn. Its nodding flowers, an inch across, are borne freely in March and April, upon red stalks set off by crimson-tipped bracts, and effective as seen with the pure white flowers and pale yellow anthers. Though in the main borne singly, twin-flowered stems are not uncommon upon strong plants, and the delicate petals may be smooth, or fringed and frilled in a pretty way. On fading, the flowers turn a pale rose colour and wither away so as rarely to leave seed; the plant increases by rambling underground stems, which often show their red tips many inches away from the parent crown.

Many early failures with this plant were due to roots over-propagated, badly packed, and often roughly handled. Anyone, however, who can grow *Linnæa*, *Trientalis*, or *Epigæa*, need have no fear of failing with this, and its great beauty and hardiness make it well worth a place. Some growers have found it do well in the peat beds devoted to Kalmias and Rhododendrons, where it makes a lovely carpet; others have been successful in open places upon the rock-garden; while in some districts partial shade or a north-east aspect is the most favourable. Stiff soils and those containing much lime are against it, as hindering its spread and holding an excess of stagnant moisture. A free, porous soil, in which the fibrous roots can make their way and wet can drain away freely, is essential to its well-being; and given these conditions, the plant grows well in sandy loam, peat, or any light soil which does not lack moisture in summer; rough, fibrous loam and peat, mixed with chopped sphagnum,

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* With coloured plate from a drawing by H. G. Moon, in the Highgate Nurseries.

has been found to encourage free growth. Other plants, which have done well between large stones in the rock-garden at Kew, are fed with yearly dressings of decayed pine-needles. Growth is slow until well established, and to this end pot-reared plants may be put out in spring where the ground is moist in summer, in order to gain the free growth made in autumn after the summer's rest; in dividing old roots, however, autumn is the best time to plant. The Shortia is untouched by cold, and pretty at all seasons, with its brightly-coloured winter leaves. The richness of this leaf colour varies with the degree of sunlight, and is almost wanting in shade, though the leaves and flowers gain in size and the stems are much longer, while if fully exposed the leaves are often no larger than a florin, and the entire plant hardly 3 inches high. A spot fully open to the light but screened from hot sun is the best, giving a fairly free growth without loss of leaf-colour and without bleaching. The plant does well also in wide, shallow pans, growing late into autumn and starting early in spring, when a good plant will carry 40 to 50 blooms at a time with beautiful effect in the cool greenhouse. Some gardeners cover the plants with cold frames as securing larger and purer flowers, undamaged by wind or splashing rains. The plant of our plate is a pretty rose-coloured form, effective as a contrast to the pale flowers of the white kind, which is shown in the background. Rosy and semi-double flowers occur but rarely among the wild plants, and this new variety, shown last year by Messrs Cutbush, is a recent and finely-coloured importation.

Shortia is a little group of only three kinds, named after Dr Short, an American botanist. The other species are *S. Davidi*—a plant known only to botanists—and *S. uniflora*, from the north of Japan, and so near the American kind as hardly to be distinguishable from it. Its flowers, upon stems of about 4 inches, are a little smaller, with white stamens and pale pink petals veined with white; the leaves also, though very similar to *galacifolia*, are distinct in outline and dentation. It was the finding of this plant in 1868 which led to renewed search for the American plant in North Carolina. *Shortia uniflora* is a scarce plant, as yet hardly known in gardens. The plant sometimes known as *Shortia californica* is really *Actinolepis coronaria*, and has nothing to do with this group.

THE PINE CLOSE PLANTED.—I have lately measured some Spruce Fir in a German forest —stems of 70 to 80 feet high, and not more than 3 to 4 feet apart. In some cases they even stood closer. Every tree must have room to grow if it is to attain a useful size, but our way of planting Conifers, in which each tree must stand apart, is silly. In the mountains of Auvergne, I have seen trees of the Silver Fir—and very fine ones—within a yard of each other. In these cases no doubt climate, tree, and soil, suited each the other as they always should do if we seek good results from woodland planting; but if anything will do so, these instances tell us that the true way is in massing trees of this nature, and also that we should never try to preserve their nursery dress of boughs down to the ground. Tops as well as trunks should stand well together, for shelter and for mutual aid in other ways, and also, finally, for their beauty of stem.

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THE GREATER TREES OF THE NORTHERN FOREST.—No. 22.

THE AUSTRIAN PINE (*Pinus austriaca*).

On the Sussex Downs lately, I was pleased to see how well the Austrian Pine was doing, although usually in small numbers and not well planted. Considering the range of country in southern England over which poor chalky soils extend, it is fortunate that we have such a good tree for them. The planting was done in a spotty way, and no other trees were put in with the Pines to help them a little, such as Beech or even Furze, which would keep the ground cool and soon form a leaf-canopy. They were also in small patches, whereas the larger the area planted, the simpler the fencing, and the better the shelter. This Pine is a native of Lower Austria, to which I lately made a journey to see it, and a very picturesque tree it is, and one of the few trees that do well on calcareous soils, while it is quite hardy and trustworthy in other ways. Like most trees planted in Britain, it is too often planted to stand by itself, so that the branches develop overmuch, while the rain, which should fall on the tree roots, is absorbed by the grass. The true work of a Pine is to put all its energy into the stem, and to throw off its lower branches. Close planting with other trees around would not mean that we should not eventually give room for the Pine to attain its full growth, as thinning could be carried out so as to allow of this as time went on.

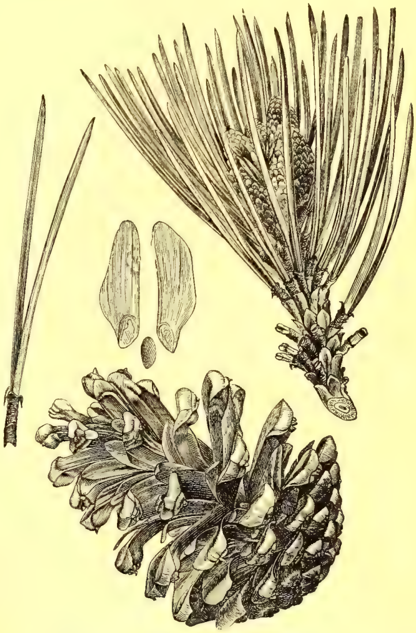
On exposed shore-lands it grows well where few other Pines will succeed, and where other trees are damaged and stunted by the winds. Planted along the margins of plantations, it is bold in outline, owing to its dense, dark-coloured foliage. When planted for a screen or shelter, it should be allowed plenty of room, *e.g.*, planted at about 4 feet apart. More than any other Pine, it will grow well in a great variety of soils: in low-lying ground, where the soil is heavy, and on the dry and lighter soils of the hills, but not so well on pure sand.

In some botanical books, the Austrian Pine is classed as a variety of the Corsican Pine; but for planters, with whom mainly we are concerned, it differs from it in its habitat (coming from a cold and inland country), growth, colour, and form, and is a hardy tree for northern countries, giving precious shelter and good evergreen covert. It may be easily told from the Corsican Pine by its heavy dark green foliage, larger cones, and its growth when young. Its maximum height is about 100 feet, with a stem 9 to 12 feet round, but it is oftener less than this. Its stem is straight, and the crest ample and well furnished, spreading when old. The roots are strong and tenacious, penetrating a long way into the clefts of rocks, and so enabling the tree to maintain its hold against violent gales. The very slender tap-root which is first formed, disappears in a few years. The dense, erect, and rigid foliage may last from five to six years, but four years is the average limit, and even less on poor soils. Though it will bear close planting better than any other Pine, woods of it should be freely thinned after a certain time, as it is very spreading. Its native country is among the mountains of Lower Austria, Styria, Carinthia, etc., and in those districts it comes down to the plain within a zone of from 900 to 2,400 feet above the sea-level. Though enduring the driest and stoniest of rocky soils, it is most frequently found upon limestone and dolomitic soils, for which it is better adapted than any other Pine, thanks to its thick canopy and abundant leaf-cast.

The wood of the Austrian Pine is good in quality, resembling that of the Corsican Pine, but, being quicker to grow, its annual rings are wider, and the wood is consequently not so close or so finely grained. It is harder, heavier, and fuller of resin than the wood of the Scotch Fir, and more lasting and better as fuel.

The abundant castings of the foliage of this Pine, especially when young, and their rapid change into leaf-mould, make it a valuable soil-maker. With even a short rotation (say, of twenty years), a wood of this Pine not only yields a considerable quantity of firewood, but is a storehouse of fertility, whether for direct application to land, or allowed to accumulate and enrich the soil, which, in the course of a few years, is thus fertilised without the help of any manurial or other dressing.

Foremost among the gains in planting this tree, is its peculiar fitness for a wide range of chalky country in southern England, where few other trees will grow. There is no land more desolate than much of that country—treeless and almost naked, without shelter or woodland beauty of any kind ; while here is a tree that will not only live in these conditions, but actually enrich these arid wastes, running as they do through several ranges of hills. The Beech is the only other tree which serves this purpose, and the two might sometimes be associated, one helping the other : the planting should not be done in little dots and skinny lines which the drying winds pass through at once, but in bold masses which are easier to fence and to tend in every way.



Leaf and Cone of Austrian Pine.

Increase.—This tree is offered in the right state for planting, and at reasonable prices, in all forest nurseries ; there is therefore no need to raise it in private nurseries, where too often we see it kept overlong and until too big to give the best results in planting. The stage that is known in the forest nursery as "three years transplanted" is the best. This tree, like other Pines, is a victim to the idea so long prevalent in Britain, that they should be set apart like milestones; and if, by chance, trees should be found comfortably gathered together, they must be over-thinned, and thereby injured. Plant close—never more than 5 feet apart, 4 feet is better still. Where the soil is suitable, Larch may be planted of about the same age, the distance apart to be the same in either case. The Larch, being the more useful in its early life, would be cut away to give room to the Pine. In all cases where poor, rocky soils prevail, there is, at the outset, very little to nourish a Pine in years with as low a rainfall as seven out of ten recent years have shown. In much of the west and northern country this is not so much felt. But think of the condition of our hot South Down slopes, or some of those wide Wiltshire chalk deserts, during recent hot seasons. All the more fertile land on the hills is cultivated; the steep slopes and worst soils remain for planting, and it will make all the difference as to result, whether we stand our trees close together or in thin open ranks. The close-set little trees will soon keep the sun's rays from the soil, kill the grass, and set to work to make good soil for us, where the trees, set wide apart, would starve. Encouraging the trees to spread out their branches also delays the formation of leaf-soil, while, owing to the very close habit of the young trees, they present a far greater leverage to the wind. On the other hand, those that put all their energies skywards, shelter each other, drop their infant garments in the shape of lower boughs that have done their work, and are far more ready to meet the wildest storm, sleet, or snow. As to season of planting I prefer the autumn, from about the 1st of November to Christmas, especially upon hot, earthless wastes.

SYNONYMS.—*Pinus austriaca*, Hoess.; *P. calabrica*, Delamarre; *P. dalmatica*, Vis.; *P. Laricio* var. *austriaca*, Endl.; *P. Laricio* var. *nigricans*, Parl.; *P. Laricio* var. *stricta*, Carr.; *P. leucodermis*, Antoine; *P. magellensis*, Guss.; *P. maritima*, Koch.; *P. nigra*, Link.; *P. nigricans*, Hoess.; *P. Pinaster*, Bess.; *P. romana*, Hort.; *P. sylvestris*, Baumg.; *P. taurica*, Hort.

REFERENCES.—Woods and Forests; Gordon, Pinetum, p. 229; Loudon, Arboretum, vol. 4, p. 2,205; Veitch, Manual of the Coniferæ, p. 144; Boppe, Les Forêts, p. 100; Webster, Hardy Coniferous Trees, pp. 90 and 155; Selby, Forest Trees, p. 431; Mouillefert, Exploitation et Amenagement des Bois, p. 147; Cannon, Semer et Planter, pp. 43 and 150; Nisbet, Our Forests and Woodlands, p. 211.

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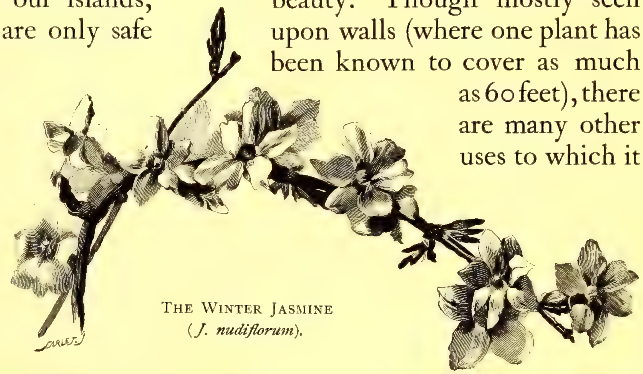
THE SPELL OF THE ALPS.—For some of us, the Alps have a charm surpassing any sensation as of the sightseer or the Alpine climber. They are a welling source of life and happiness, impelling us to rejoice anew in their matchless panorama and varied beauties of plant life. They fill us with that fulness of human delight in which body, soul, and spirit unite with such harmony and force as if care and weariness were strangers to our being. More, they inspire to heights in which all else is forgotten in the pure love of Nature. These are the joys the mountains hold for us, and surely they are ample; but, in the man himself is the true source of one half the beauty he enjoys. The mountains may be the exciting cause which so develop our sense of ecstasy, yet there are hearts in which the same beauty awakes no more response than with the brutes. To you it is given to know the spell of an alpine sunset. You speak of it with tenderness, but the tenderness comes from your own heart; you murmur, "How glorious," but the glory is one half your own.—FRANÇISQUE MOREL.

THE JASMINES (*Jasminum*).

Though containing few hardy kinds, the Jasmines have long held front rank in the gardens of the world. The 120 or more species are widely spread over the eastern hemisphere, British India claiming the largest share with 40 to 50 kinds, while others are scattered more sparingly through the Malay States to China and Japan, and thence by way of the East Indies to Australia and the southern seas. To the west they are fewer, and confined to a few kinds in Africa and islands of the Indian Ocean, with two in Europe, two in the islands of the Atlantic, and only two in the whole of the American continent—*J. lanceolatum* in Peru, and *J. Bahiense* in Brazil. The greater part are hothouse climbers, though some dozen or more kinds may be grown in the open air in the southern parts of our islands, though several of these are only safe upon walls. They are summer-leafing, sub-evergreen, or evergreen in foliage, with white or yellow flowers only varied in two or three cases by faint flushing of the outer petals, and are often richly fragrant. This sweetness has been celebrated from the earliest times, coming to us mid legend and Oriental fable which have left their traces in the Arab name of Jessamine. By a choice of hardy and tender kinds, it is possible to gather Jasmine flowers the whole year through, and even with the hardy plants alone the circle of the seasons is not far from complete at times when the Winter Jasmine opens its first flowers in November, when the last white stars of the common Jasmine have hardly dropped before the autumn gales. A slight defect of the Jasmine is its fleeting flowers, hardly atoned for by their freedom when it means that, of many kinds, the flowers must be gummed separately when used for decoration. The double flowers of the Arabian Jasmine are the most lasting, and pretty used with Parma Violets or bright Bouvardia sprays for buttonholes, but their fragrance is too strong for some tastes.



The Winter Jasmine (*J. nudiflorum*).

Uses. No garden can be complete without the Jasmine in some of its forms, for no other flower yields such perfume in summer, while *J. nudiflorum* stands alone for wintry beauty. Though mostly seen upon walls (where one plant has been known to cover as much as 60 feet), there are many other uses to which it may be put, either in pots or baskets for the conservatory; as tufts in the open border, which flower later than on walls; upon rocks or roots, where it is prettiest with brightly fruited Cotoneasters or *Cratægus Pyracantha;* as a graceful, drooping edge to banks or borders, or even as low hedges in the flower-garden: in all these ways it may be used with great effect, and enjoyed when there is little else to enjoy. It will flower well in a north aspect and even in partial shade, and the finest use of it I ever saw was on a steep and shaded bank at Cannes, where the branches were layered year by year and spread amongst Myrtles and other wild undergrowth into a sheet of colour, where nothing else would flower in winter. Nothing is easier than this use of it upon banks, especially if planted with leafy shrubs, such as the evergreen Barberry (*Berberis Aquifolium*) to cover its scantiness; it stands drought well, and colour is easily supplied in summer by allowing a few tuberous Tropæolums or other light climbing plants to find support and shelter among the wand-like branches. So far from displacing this old Winter Jasmine, its new form, *J. primulinum*, comes as a good succession, equally useful, and flowering rather later. Though grown in France, where it was first introduced, I cannot find that the pretty pink-flushed kind, *J. polyanthum*, has yet been tried in England. It would be interesting if only to see if it showed colour here, such delicate suffusions being sometimes lost with change of climate; but coming from Yunnan it should be hardy in parts of our country, and welcome for its fragrance and distinct habit. Many of the dwarfer Jasmines are excellent as hanging or basket plants, and their easy increase from cuttings—in heat during spring for the greenhouse kinds, and in a cold frame in early autumn for the hardy ones—places them within the reach of all. And further, they may be pruned at will, provided it be done at the right time,—the summer flowerers in late spring, and the winter bloomers as soon as they are out of flower.

It is interesting to note the means adopted by Nature to secure the fertility of the Jasmine flowers, spite of their long, narrow tubes, the entrance to which is well-nigh closed by the projecting anthers, and self-pollination made even more unlikely by the habitual droop of the flower clusters. This need is met by a moth with a long proboscis, which passes its time flitting from flower to flower, brushing through the anthers, and diving to the depth of each corolla in order to exhaust the honey sac at its base, and meantime carrying to the pistils the fertilising grains of pollen which could not have reached them by any other means. Probably one reason for its fruiting so rarely with us, is the scarcity of this insect in Britain.

Jasminum affine.—This name really belongs to a species from the Malay States, probably not in cultivation in this country, but is more often used for a large-flowering form of the Common Jasmine (*J. officinale*).

THE CAPE JASMINE (*J. angulare*).—A graceful and free-flowering greenhouse shrub from South Africa, thriving as a pillar plant, or under the roof. The leaves are cut into three leaflets, and the stems are angular; flowers white, very fragrant, and long in the tube, hanging together as loose clusters in sprays of three.

GOLDEN JASMINE (*J. aureum*).—One of the many Himalayan species, with large, much-divided leaves and golden flowers.

BOURBON JASMINE (*J. auriculatum*).—A stove climbing shrub with downy leaves, either simple, or cut into three oval leaflets; large white flowers during summer, the corolla cut into seven lobes. Abundant and very beautiful in the forests of Mauritius and other islands of the Indian Ocean. Syn. *J. mauritianum.*

THE WHITE AZOREAN JASMINE (*J. azoricum*).—A pretty evergreen shrub, too tender for any save the warmest British gardens, but growing well when planted out in a greenhouse. It is of free growth, with long, twining shoots of fine effect for cutting, the glossy bright green leaves cut into three heart-shaped leaflets, and fragrant white flowers during summer and autumn. Azores and Madeira. There is a variegated form.

Jasminum calcareum.—An Australian species with thick, undivided leaves, threaded by three or five strong veins, and sweet flowers in spring and summer. Though offered by American growers, this plant does not seem to be under cultivation in this country.

FESTOON JASMINE (*J. didymum*).—A graceful winter-flowering climber from tropical Australia and the Pacific Islands. Of twining habit, it shoots up quickly to fall again in long, drooping festoons of glossy green, bearing a multitude of small white flowers arranged in twos to form long and narrow clusters, sweet, and pretty for decoration.

LORD ILCHESTER'S JASMINE (*J. floridum*).—A nearly hardy kind introduced from China in 1884, and if less showy than those with larger flowers it is a pretty plant which blooms freely upon sheltered walls at Kew and elsewhere. Its flowers are yellow and about half an inch across, coming in loose clusters from July, and the glossy leaves cut into three leaflets. Syn. *J. subulatum.*

BROOM-LEAVED JASMINE (*J. fruticans*).—A hardy evergreen shrub from the south of Europe, of erect growth and thickly branched, but its glossy green leaves are scanty at all times and fall in hard winters. A pretty plant, flowering through a long season, and best left to spread into picturesque masses by its abundant suckers; trained over an old tree stump in the wild garden, its many yellow flowers in June and July are very welcome, and stray clusters often continue until autumn. Though not a climbing plant it may be trained to walls in cold districts, where its neat thrice-cut leaves will cover 10 or 12 feet, and seldom fail to flower. The flowers—composed of blunt, rounded petals—have little scent, and occasionally are followed by shining black berries of the size of peas. 1570. Syn. *J. luteum.*

THE GREY-LEAVED JASMINE (*J. glaucum*).—An evergreen greenhouse plant from South Africa, with greyish undivided leaves of oval shape, and flowers like the common kind, but longer in the tube and larger. It is easily grown in a cool house, flowering in August, its fragrant clusters useful for cutting; pretty little standards of this kind flower well in pots. Syn. *J. ligustrifolium.*

BORNEAN JASMINE (*J. gracillimum*).—One of the best of winter-flowering stove plants, finely fragrant, with long, arching shoots wreathed in white flowers which hold better than in other kinds. It may be grown in pots as a bush plant, flowering very young and easily; trained around columns with fountain-like grace; allowed to spread and hang freely under the roof where valued for cutting; or even packed into baskets from which it droops with the prettiest effect. Its fragrance is perhaps hardly so refined as in other kinds, but the starry white flowers are so large (9 petals) and carried so freely throughout the winter, as to weigh down the shoots. It should have free exposure to light and air in the cooler part of the stove, doing

THE BORNEAN JASMINE (*J. gracillimum*).

best in a gentle forcing heat; it is rather subject to white scale, but should this get hold, a free pruning will do no harm. It grows well in rough loam and peat, and is easily increased from suckers, cuttings of half ripened shoots, or root cuttings. Travellers in Borneo are much impressed by its beauty during the wet season, when the woods are everywhere lighted by its flowers, which are much used for garlands and for personal adornment by the native women; in the dry season the same bushes hang limp and mournful, or are browsed to the bare stumps by cattle, yet seem none the worse for this drastic pruning.

SPANISH JASMINE (*J. grandiflorum*).—Though long known as the Spanish or Catalonian Jasmine, this plant belongs to India, whence it was brought by the early Portuguese, spreading to other parts of Europe, where it has long been the object of an important industry. Its large flowers and fine fragrance have made it a favourite all over the world, and it is now as much at home as a beautiful undergrowth in the West Indian forests as in Asia. While not unlike the common Jasmine its flowers and leaves are as large again, the blossoms with more substance and often suffused with pale pink on the outside; its habit of growth also is looser, and the plant less hardy and free. Its tenderness is increased by grafting upon *J. officinale*, the plants raised from layers or cuttings being far more enduring. Though it will stand a good many degrees of frost upon a sheltered wall, in the colder parts of our country it is only safe under glass, where, planted out, it flowers through a long season and is useful for cutting, though, as with most Jasmines, the flowers drop quickly. It also grows well in pots, pinched into bush form and flowered in gentle heat; grafted standard-high on the common kind, it is a favourite market plant upon the Continent, flowering well when well ripened in the open during summer. Grown upon walls in the warmer parts of the country it often does well through a series of mild years, when plants of 15 to 20 feet high are not uncommon; but it is liable to be cut down in hard winters, and the flowering season is short in the open, being at its best in August and September. It will grow in almost any moist, fertile soil, but too much wet causes disease; pot plants should never be overpotted. Prune in spring before growth is made, when the shoots may be cut in to three or four eyes. In the south of Europe it is much grown for the essential oil yielded by its flowers and highly esteemed for centuries past; in our own country the plant has been cultivated since 1629. There are forms with double and semi-double flowers, but as a rule they open badly. Another plant which in gardens often goes by the name of *J. grandiflorum* is really *J. affine*, the large-flowered form of the Common Jasmine.

THE SPANISH JASMINE.

THE ODD-LEAVED JASMINE (*J. heterophyllum*).—A strong-growing kind from Nepaul, which often reaches the size of a small evergreen tree, with long, rambling branches and rugged brown bark. Its leaves are large, thick, and mostly uncut, with a waved surface; sometimes however they mingle with leaves cut into three leaflets—whence its name of "various-leaved." It is fairly hardy upon walls in this country, an old plant introduced in 1820 having lived thus for many years in the garden of the Royal Horticultural Society at Chiswick, freely showing its sweet and brilliant yellow flowers in summer.

The Italian Jasmine (*J. humile*).—A low, hardy shrub introduced from the south of Europe in 1656, though really a native of India and nearly allied to *J. revolutum.* It is of erect growth, and seldom more than 3 or 4 feet high, with angular branches thickly covered in June by pale yellow flowers continued more sparingly into September. They are smaller than in *J. fruticans*, without smell, and last well when cut; as less hardy, the plant is safer with some protection, blooming earlier when in sheltered places. It is an uncommon shrub, growing freely in any free soil and with little attention, but less ornamental than *revolutum* from the loss of its leaves in winter and its lack of fragrance.

Maingay's Jasmine (*J. Maingayi*).—One of the newest of hothouse Jasmines, introduced two or three years ago by Messrs. Sander from the Malay States, where it was found some twenty-five years since by Mr Maingay, a government official. It comes near *J. pubescens*, but with thick, leathery leaves of oval shape, 5 inches long by 2 inches wide, longer in the stalk than most kinds, with clusters of starry white flowers an inch across.

The Winter-Flowering Jasmine (*J. nudiflorum*).—Too familiar to need description, the golden flowers of this shrub are among the few good winter flowers that we have, gladdening the heart from November into February or March, according to season and aspect, and redeeming gardens from desolation at midwinter, even amid the smoke of cities. It was first grown as a tender plant for the greenhouse, and in America is still valued in this way for its winter effect, proving almost an evergreen under glass. Far wider and more varied use might be made of it in our gardens. For cutting, the sprays are very useful, lasting with a succession of buds which open well in water, and very pretty with twigs of Cryptomeria or similar dainty foliage; for this purpose its loose habit should be encouraged; indeed, close training should be avoided at any time, the freely trailing shoots gaining in beauty when left to hang naturally against a dark background of fine-leaved Ivy or other evergreen. There would seem to be a form of the plant, which, though the same in all outward respects, is of denser, more rigid, habit and bush-like form, flowering a little later, and less easily increased from cuttings; this kind is the best for hedges and tufts in the border and rock-garden. The trailing variety, which throws long sprays, is better for walls, for cutting, or the ledges of large rocks, and roots freely from cuttings or wherever its stems touch the ground. In the south of Europe the flowers of the Winter Jasmine are often prettily flushed with red on the outside in a way not seen with us. There is also a rather pretty variety in which the leaves are edged with bright gold, making it more interesting in summer, while it is at the same time hardy and free in flower, if somewhat less vigorous than its parent. It is still too common to see this beautiful shrub cut in the autumn so as to be "tidy" during winter, regardless of the fact that each click of the shears sacrifices scores of dormant flower-buds; pruning, when necessary, must be done at once after flowering. Sent from North China by Fortune in 1844.

Madeira Jasmine (*J. odoratissimum*).—A pretty evergreen kind, of bushy habit, reaching 3 to 5 feet, with a long season of flower. A native of Madeira, it is only hardy in our southern gardens, but is well worth a place under glass in colder districts. Its foliage is of deep glossy green, cut into blunt leaflets and carried upon rigid brownish stems; the flowers are scented like Jonquils, composed of 5 blunt lobes, and bright golden fading to white. The plant grows well in dry places, and is increased from suckers and layers, or will flower the second season from seed. In the south of France and Italy it is grown under the name "Jonquil-scented Jasmine." There is a variegated form.

Common Jasmine (*J. officinale*).—Though a native of southern Asia, this has been naturalised in Europe and well known in this country for hundreds of years. Its hardiness, its strong growth—which often reaches 20 to 30 feet against sheltered walls—its profusion of white flowers from June to August, loved everywhere for their fragrance, and its cheerful growth even in towns, are merits that have endeared it to all. It is evergreen save in the coldest spots, reaches a great age, with stems many inches round and rugged as a Cork Oak, spreads freely by suckers though rarely fruiting in this country, and will grow in almost any position and especially well in the dry borders against houses. There are several garden varieties of which the best is *affine* (also known as *grandiflorum* and *ochol-eucum*), with larger and more numerous flowers of a distinct creamy-white. Variegated forms exist, but are tender and poor in flower; the best of these, known as *aureum*, is pretty in leaf for cutting, but can only be relied upon against warm walls in the south, or under glass in colder places. The double-flowered form, known as *Duchess of Orleans*, is worthless in the open but expands better in heat. Though in gardens of southern Europe the common Jasmine has given place to the large-flowered kind (*J. grandiflorum*), the plant is grown in some parts for the making of pipe-stems from the hollow shoots. Carefully trained, these may be had of 12 to 16 feet in one season, being protected by bands of varnished calico or linen, and sponged with citron-juice from time to time to induce the light colour fancied by wealthy oriental smokers. The finest of these pipe-stems fetch as much as £20 apiece.

CLUSTERED JASMINE (*J. paniculatum*).—A scarce plant from southern China, thriving only in a stove where it flowers from early in the year. It bears oval evergreen leaves and tapering clusters of white flowers at the tips of the shoots.

THE PINK JASMINE (*J. polyanthum*).—A distinct and beautiful plant found by Delavay in Yunnan, North China, more than twenty years ago, yet still hardly known in gardens. In appearance it comes very near *J. grandiflorum*, but the leaves are much larger and of different shape, and the white flowers very long and slender, and prettily flushed with pale pink on the outside. Its way of growth is also distinct, spreading as a hedge-plant in its own country, by means of slender, twining stems more truly climbing than in most other kinds. The leaves, composed of 5 or 7 leaflets, are thick, narrow, and of pale greyish-green, smooth save for hairy tufts upon the veins of their under surface. The flowers are borne in long, cone-shaped clusters at the ends of the branches, and as smaller heads upon side-shoots all along the stem, forming together the most graceful of white wreaths, and highly fragrant.

THE PRIMROSE JASMINE (*J. primulinum*).—This new hardy Jasmine from Yunnan was fully described with a coloured plate in our second volume, p. 168. It is an evergreen form of *nudiflorum* rather than a distinct species, for, though larger in leaf and flower, it does not differ from it in essentials. It is hardy in our country, even with severe frost and a cold aspect, so that with flowers nearly as large again as the Winter Jasmine, it promises to be a most useful plant to succeed it, flowering a little later in spring. It is easily increased from suckers or cuttings, small plants flowering freely. Semi-double forms exist, but are far less effective than the simple flowers.

HAIRY JASMINE (*J. pubescens*).—A good winter blooming greenhouse plant, hardly as graceful and not so free as *J. gracillimum*, but more refined as to fragrance and requiring rather less heat. It is best trained against a wall or the end of a house, and flowers from November through the winter, the large white clusters coming first at the tips and then from side-shoots, so as to be rarely without flowers. They hang together loosely, but absence of stalk gives a stiff appearance increased by a "collar" of small leaves beneath them; their fragrance is strong and penetrating, like that of the Arabian Jasmine (*J. Sambac*). The under side of the leaves, their stems, and the young shoots, are clothed with fine hairs from which the species takes its name. Increased by suckers, or cuttings of half-ripe wood rooted in early spring; these will flower quite small if grown on freely in heat until summer, slowly hardened and then ripened in the open air, to be gently forced into flower from November as pretty pot plants for decoration. India and China. Syns. *J. hirsutum*, and *multiflorum.*

YELLOW NEPAUL JASMINE (*J. revolutum*).—Though classed as a form of *J. humile* this handsome shrub is distinct in effect and evergreen, though it casts its leaves in severe frost and is sometimes cut to the ground. For this reason, though not really a climbing shrub it is grown mostly on walls, quickly covering a large space with its dark glossy leaves cut into leaflets. The flowers are bright yellow, coming in clusters at the tips of the shoots from the end of May into autumn, and very fragrant in a warm, sunny aspect. In sheltered gardens of the south coast this kind grows in the open as a beautiful shrub, one large old plant at Ventnor being nearly 30 feet round. Unlike most of the Jasmines it is not easy to increase, cuttings of half-ripe wood with a heel being so slow to root that layers are often preferred. High mountains of Nepaul and Hindoostan. 1812. Syn. *J. triumphans.*

THE ARABIAN JASMINE (*J. Sambac*).—This beautiful and capricious plant is not always thoroughly at home under glass, and at times fails completely. Where it grows well, few stove shrubs are more fragrant—especially towards night—with white flowers like a Gardenia and useful for sprays and bouquets. It is a climbing shrub of straggling growth and 10 to 15 feet high, doing best when planted out in a warm border; the shoots need careful thinning and stopping to force side spurs which flower most freely, old growths being renewed by young shoots trained from the base. When well-grown it is almost constantly in flower, though freest in spring and autumn; the leaves are rounded, thick, waved, and almost stemless; the white flowers of fleshy petals fade to a brownish purple, and are so fragrant as to be unpleasant if used in quantity. It is not easily raised from cuttings, owing to the persistency with which all side shoots show flower and remain dormant (even though rooted) for months together; to ensure success, an old plant should be cut in, and growing shoots taken in early spring before they are too stout and vigorous. To succeed with the Arabian Jasmine, good soil, abundant light, and warmth without too close an atmosphere are necessary; do not allow much soil, and prune well after flowering. On the shores of the Mediterranean it is much grown for its perfume, the flowers being gathered at nightfall as they open. Two or three varieties of this old plant are grown in gardens including double and semi-double forms which are more lasting than the flowers of any other Jasmine, and produced during a long season though sparingly. Never very strongly rooted, these plants should not be overpotted, and with care last for many years.

AUSTRALIAN TREE JASMINE (*J. simplicifolium*).—A robust hothouse climber of slender habit, reaching the size of a small tree. Its leaves are oblong, undivided, and deep glossy green, with fragrant white blossoms in large branched clusters—the flowers composed of long, pointed petals of star-like and elegant effect. Australia, New Caledonia, and Norfolk Island. Though often seen in a stove, it does very well in a conservatory. Syns. *J. gracile*, *lucidum*, or *volubile.*

THE AFRICAN JASMINE (*J. streptopus*).—Another of the few African species—a greenhouse plant with star-like flowers of ivory-white, freely branching, and flowering from the tip of every shoot.

THE JAVA JASMINE (*J. trinerve*).—A tall, climbing plant with large, uncut leaves upon short stems, and strongly three-nerved on the under surface; fragrant, white flowers in small clusters. B.

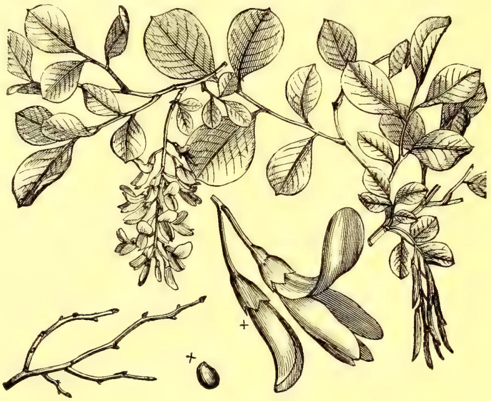
KENTUCKY YELLOW-WOOD
(*Cladrastis lutea*).

THE genus Cladrastis, belonging to the great Pea-tribe, contains only two species—*Cladrastis amurensis*, a shrub from the Amoor valley, and *Cladrastis lutea*, found in Kentucky, Tennesee, and the western part of North Carolina. This tree, known as the Yellow-wood or Virgilia, is rare in cultivation, though in every way a charming tree for ornamental planting. The name *Cladrastis* is probably from a Greek word meaning "brittle-branch," and referring to the fragility of its wood, shared by some other members of its family, such as the Robinias, which strew the ground with twigs and branches with every high wind. It is therefore best to plant such trees in as sheltered a position as possible. Although the Yellow-wood is classed by planters among small trees, yet in the rich bottom-lands it reaches a height of 60 or even 70 feet, with a trunk 9 or 10 feet round; these large trees, however, are rare. As we usually see it in gardens, it forms a beautiful smooth-barked tree 30 or 40 feet high, with a spreading habit and almost always better developed on one side than on the other. Even when fully exposed and with no interference from other trees, it will put forth more and larger branches in one direction, and that not always the sunny side ; this is not easy to explain, but all the trees that have come under my notice show this one-sided growth, inclining generally to the best sheltered side. The leaves of the Yellow-wood are oddly pinnate with the bases of their stalks hollowed to enclose the leaf-buds of the following year. The oval (or ovate) leaflets number from 5 to 11, they are 2 to 4 inches in length, and of a cheerful, intense colour, which is hard to describe. This tone of green, combined with the way in which the foliage droops in short, horizontal layers, throwing marked contrasts of light and shade, gives to the Virgilia a peculiarly sunny expression. The foliage dances in the lightest breeze, and the pure tone of its green lingers until the touch of hard frost, when, turning a glowing yellow, it still further deserves the name "golden" to express its sunny warmth. On the other hand, the Robinias, which the Yellow-wood resembles in some ways, soon lose their freshness under the fierce sun and drying winds of our summers, and before autumn take a prematurely faded look. The scented flowers of the Yellow-wood appear in May or early June as large clusters of creamy pea-shaped blossoms, 6 to 8 inches in length, and very freely produced. It is one of those graceful trees which, like the "lady-birch," give the idea of feminine slenderness and refinement, as contrasted with the rugged strength of the Oak, the Chestnut, or the Beech. Its very caprice of outline only adds to the charm, as avoiding the tameness of more evenly shaped trees.

The Virgilia must be planted small, and is particular as to soil and shelter. Here, at "Rose Brake," it has grown as freely as a Locust Tree, planted in fairly good loam on a clay subsoil, and a sheltered spot between gently sloping hills running parallel and almost due east and west. Its stem divides about 18 inches from the ground, spreading in V-shape, and each part again divided in the same way, with its largest development on the western side. There is (or was a few years since) a famous old tree growing in the Bartram Gardens, Philadelphia, which has just this trick of thrusting forth its main branches on the western side. In Germantown, Pa., there used also to be a fine old Virgilia mentioned by Michaux seventy years ago. I do not know whether it is still alive, but twenty years ago it was in full vigour, 60 feet high, with a spread of over 70 feet round. This tree hung over a road upon its southern side, the opposite side being shaded by large Pines. *Cladrastis lutea*, with its pretty, fragrant flowers, its fine foliage effects, and its graceful appearance, should be valued in landscape gardening, being also a clean tree which is seldom attacked by insects or disease. It begins to flower when quite small, and is worthy of a choice position where its branches cannot be broken by wind.

If our little tree must change its name

from Virgilia to Cladrastis (which is not nearly so pretty), I hope it may keep its descriptive name of *lutea*, which seems to suggest the sunny appearance of a well-grown tree in May, with the full light shining on its foliage, while each long flower-cluster exhales fragrance and enjoyment. The other secondary names applied to it—*fragrans* and *tinctoria*—are far less apt ; *tinctoria* referring only to the dye drawn from the hard yellow-wood of the trunk, while *fragrans* calls attention to one only of its many charms. The late Mr Stiles, formerly editor of *Garden and Forest*, was so fond of the Yellow-wood that there is hardly a volume of that journal which does not touch upon its beauties. Thus, in the issue of October 28th, 1802, he says :—" Apart from its beautiful flowers, graceful form, the delicate texture of its bark and ample foliage during the summer, the Virgilia deserves notice among the most charming of our native trees for its autumn colouring. While the majority of trees whose dead leaves do not cling to the branches all winter are entirely stripped, the Yellow-wood is still well clothed with foliage of a clear yellow, which is especially bright when the sun shines on it." Again, in Volume VI. there is an enthusiastic letter in praise of the Virgilia as seen in the neighbourhood of Boston. After mention of one peculiarity (that it blooms more freely in alternate years), the writer goes on to say :—" If any of your readers do not know this tree, let them make its acquaintance. The forests of America contain nothing better—for the lawn or garden. Although exclusively a southern tree, it is perfectly hardy as far north as Canada; it grows rapidly, is free of insects, with foliage of a charming colour, a graceful habit, beautiful flowers, and bright autumn tints. The weakness of its branches is the only fault of the Virgilia in this climate. Are there many other trees of which so much good can be spoken, with so little of ill ? " In Volume IX. also I find the following : —" The Virgilia trees are now (June) flowering in the parks and gardens about New York with unusual profusion. The weight of their blossoms is so great as to give the branches a still more drooping habit than they naturally possess ; and as they wave in the wind, the long racemes of pure white flowers among the light green and delicate foliage, make a picture which cannot be excelled for beauty, especially when seen against some dark background like a mass of conifers." Messrs. Elwanger and Barry of Rochester, New York, state that in their nurseries the Virgilia blooms every other year.



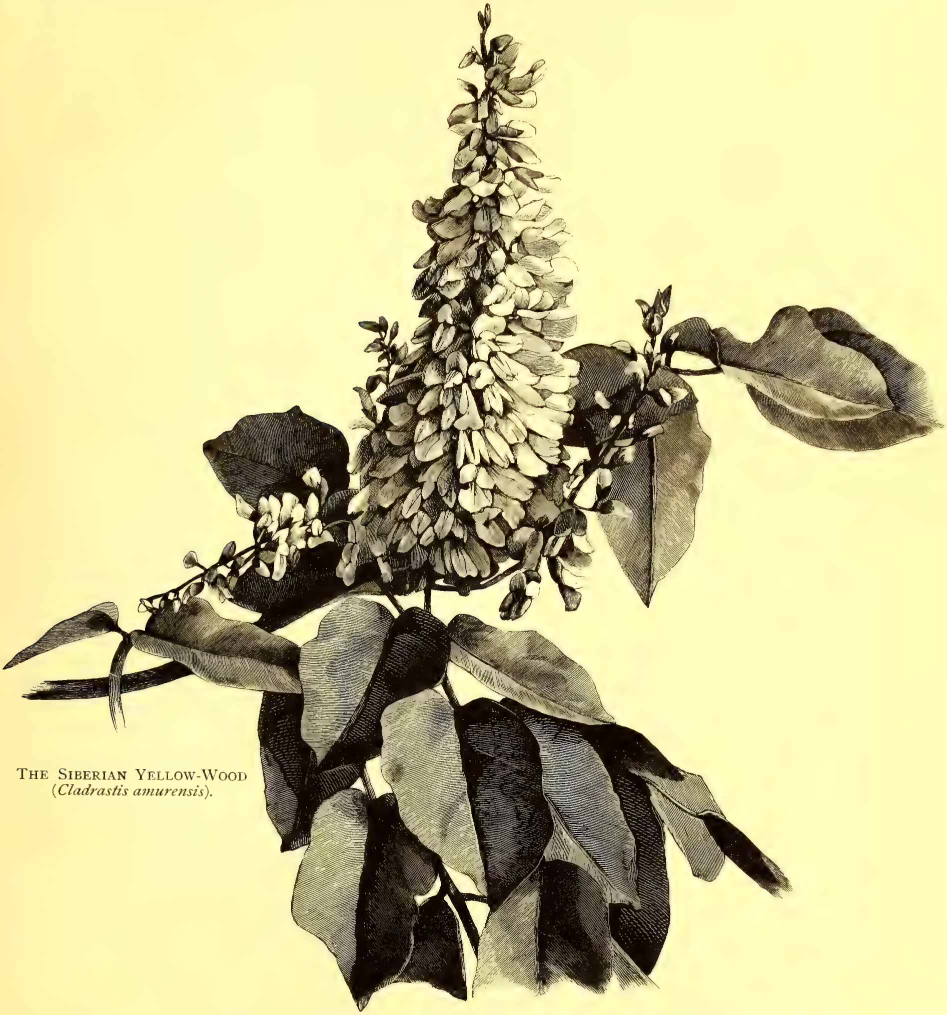
Professor Sargent has the following note on this tree :—" The nature of the buds of Cladrastis enables it to flourish many degrees north of the restricted area west of the southern Alleghany Mountains, which is its home. Instead of a single bud, there are under each leaf 4 buds, one above the other, and closely compressed by mutual pressure into a rather thick cone, each bud being covered with thin, lustrous scales. The lowest one is rudimentary, and probably it is the only one that develops into a branch. If this should be injured, then perhaps the next one takes its place. These 4 buds of the American Cladrastis serve to separate it from the Asiatic plant *Cladrastis* (or *Maackia*) *amurensis*, which has solitary buds, besides differing in habit, in flower, and in minor botanical particulars from the American tree."

DANSKE DANDRIDGE.
Shepherdstown, West Virginia.

For our English readers we add a few notes upon the value of the Virgilia, or Yellow-wood, upon this side of the Atlantic.

THE KENTUCKY YELLOW-WOOD (*Cladrastis lutea*).—Although in our climate this is not of first value for its flowers (only blooming well at uncertain intervals) it is one of the most distinct of hardy trees in its beauty of form and autumn colour. It should have shelter, a light warm soil, and a sunny place, and if with a background of dark Pines, Yew, or Copper Beech, the vivid orange and yellow of its leaves in autumn is seen in rich contrast. It is one of the first trees to colour, beginning to change in some years by the end of August and growing brighter till the white frosts strip the trees with a startling suddenness—a sharp night often bringing down every leaf before noon of the next day. This renders it a good tree for trim lawns, where others with a long season of disorder create much work and spoil the grass. Its graceful outline is also best seen when planted in the open, neat even in winter with its smooth ashen-grey bark, from which the sap will flow as freely as from any Sugar Maple and with the same sweet taste. The young shoots hang gracefully in their first season but draw erect as the wood stiffens, while the drooping leaves of pretty pale green and the long white flower clusters accentuate the gently pendent habit. The leaves appear early, and are often 12 to 18 inches long on young and vigorous trees, but only half this when older ; the same difference exists in the flower-clusters, which measure 10 to 20 inches in America but are rarely more, and often considerably less, than a foot long in this country. The flowers are like those of the Locust Tree, but larger, and nearly pure white, with a faint yellow blotch in the centre, and opening in July and August instead of from the end of May, as on the other side of the Atlantic. The long thin seed-pods are not often ripened with us, but in default of seed the tree may be increased from cuttings of the root. When they can be had, seedlings grow as freely as any Locust Tree, after passing the early stages. They come so true that no variation has ever been noted, save a variegated variety, and one fine-leaved form, known as *gracilis*. Owing to its value for fuel, the tree is fast becoming so rare in its own country as to be in danger of extermination. The wood is hard, fine-grained, and difficult to split ; from its pale yellow colour it is known as American Gopher-wood. This beautiful tree flowers best in warm dry soils, but a fine summer is yet more potent, as seen in the years 1887, 1900, and 1901, when it flowered with unusual freedom in many parts of the country.

THE SIBERIAN YELLOW-WOOD (*Cladrastis amurensis*).—If less graceful in habit and outline, this is yet well worth a place in gardens, and while less showy it is freer and more certain in flower. With us it is a tree of moderate size, with a spreading leafy head, the branches held flat or slightly drooping, and the olive-green bark peeling off in flakes when old, as in the common Birch. When mature, the leaves are of darker green, tougher, and much smaller than in *Cladrastis lutea*, with erect spikes of small white flowers, densely massed, and opening in July and August. They last a long while and come so freely upon even small plants that their profusion attracts notice no less than the distinct colour of the foliage. But its beauty of leaf is most marked in spring, when the young leaves and branches are covered with a silky greyish sheen, changing to a delicate purplish shade as the leaves shake out of their folds into the sunlight. The tree is of fairly rapid growth, doing best in warm dry soils, and increased from seed, or by grafting upon the Sophora. There are as yet no full-grown trees in this country, but there seems no reason why it should not grow as large as in Amurland and Manchuria, where trees of 40 feet are not uncommon, though even in old trees the stem is rarely more than 6 inches in diameter.



The Siberian Yellow-Wood
(*Cladrastis amurensis*).

First introduced in 1880, and known for a time as *Maackia amurensis*. A variety, *Buergeri*, from Japan, has leaves covered with soft hairs on their under side. This plant may also be raised from root-cuttings, dug up in autumn, and kept moist and fairly cool in sand or moss until early spring. B.

EUPATORIUM: WITH A COLOURED PLATE OF EUPATORIUM IANTHINUM.*

Eupatorium includes about 400 species, mostly found in the warmer parts of America, related to Ageratum and Stevia, and among them shrubs, evergreen sub-shrubs, and perennials. While many kinds are of no garden value others are pretty border and greenhouse plants, easily grown, and useful for cut bloom. As pot-plants the dwarfer tender kinds are profuse in flower and often fragrant; the taller shrubby kinds are more awkward in the greenhouse unless planted out, when they are very useful for cutting. Save in a few cases they are best grown cool, lasting longer and of better habit than when in heat. By a selection of kinds it is easy to have abundance of flower from early autumn, when there is such a demand for harvest festivals, right through the winter to the following March, and while not showy, their lightness and free flowering adapt them for all the uses for which cut flowers are required. They last well in water, throw long and graceful stems, and are a great aid in setting brighter flowers to the best advantage.

No plants are more easily grown. The perennial kinds are of stout growth, thriving beside water in the wild garden, where those of tall habit are effective and the feathery heads of *E. ageratoides* and *E. aromaticum* most welcome when flowers are wanted by the armful for church decoration. The greenhouse kinds are all easily raised from eyes or cuttings, rooted in pots of sandy soil with bottom heat, during early spring. It saves labour to grow the young plants in the open ground through the summer, making bushy plants for the autumn and winter. Early in September they are lifted, and potted firmly in good soil: stood in a north aspect to recover for a few days, they must be housed before risk of frost to which the buds are very sensitive. They then flower in succession, beginning with *E. micranthum* in late autumn, followed by *riparium*, *vernale*, *probum*, and other kinds which prolong the season into March. Some sorts need a little warmth at the finish to bring their flowers to perfection, and all are much improved by a little liquid manure on coming into flower and should at no time suffer from drought. With care in this respect, red spider—the only pest to which they are much subject—is easily kept at bay. After flowering, the plants may be cut hard back and will make large spreading tufts in their second season, yielding plenty of bloom somewhat smaller than before. The quick-growing kinds are often raised afresh every year, where size of flower is of importance. In the south of Europe many of the shrubby kinds are seen in gardens and sow themselves freely, but cuttings grow with a neater habit.

The large-leaved section of Eupatorium (once known as *Hebeclinium*) to which the plant shown in our plate belongs, contains the finest of the group—shrubs beautiful in leaf and like a giant Ageratum in their mauve and purple coloured heads, coming in early spring and unlike any other flowers

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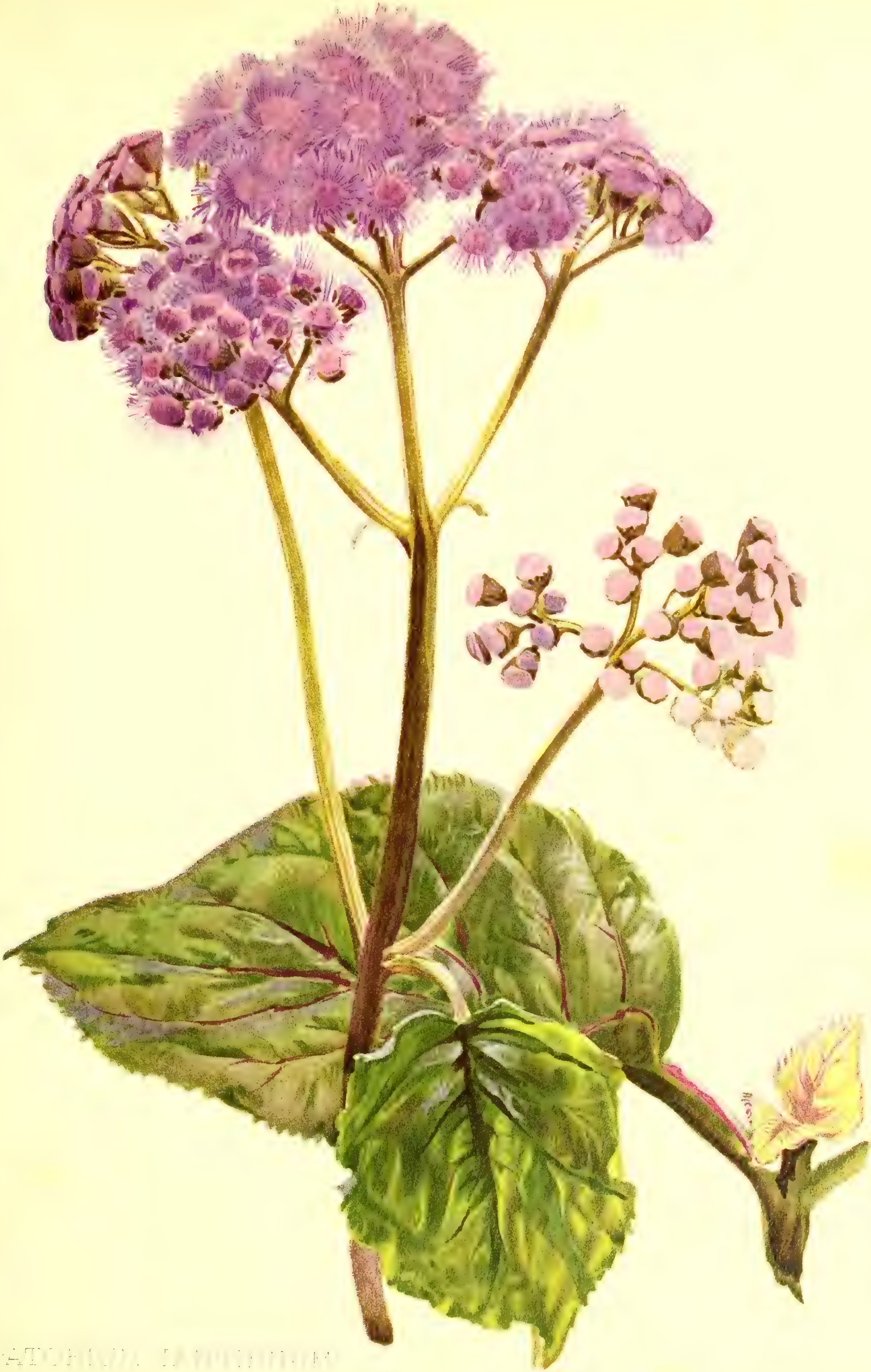
* From a drawing by H. G. Moon at Warley Place, Essex.



EUPATORIUM IANTHINUM

at that season. These kinds are kept under glass, needing more heat than the others, particularly during winter when much of their growth is made. An Australian kind, *E. Morrisii*, much grown in the south of France as a stout woody shrub, does not seem to be known in this country. It flowers so freely in autumn and again in spring, and its large loose clusters are so pretty that it should be worth trying for our conservatories, and would probably thrive in the open air upon the warmer parts of the south coast. The following species of Eupatorium have found a place in gardens :—

Eupatorium ageratoides.—The "White Snake Root" of North America, a perennial hardily indifferent to cold or heat, and good grouped in the wild garden. It varies much as to height, with branching reddish stems, thin leaves coarsely and sharply toothed, and feathery clusters of white misty-looking flowers in August and September. These wide heads are useful for cutting and borne in quantity. Division. A dwarf form is sold in nurseries as *E. Fraseri.*

E. altissimum.—One of the tallest of herbaceous plants and stately in effect in open places near water, and of such stout growth as rarely to need support though sometimes 10 feet high. It has downy stems, clothed with narrow leaves tapering at each end, and large loose heads of reddish flowers, the effect of which is partially lost by their height. North America.

E. aromaticum.—The Aromatic Hemp Agrimony of gardens, another of the herbaceous group from North America, coming near *ageratoides* but more slender and refined in appearance, and less hardy; easily known by the thicker and more bluntly toothed leaves and less branching white clusters, coming a little later in September. The white flowers are graceful, useful for cutting, and last well in water. Does best in dry places, and is a good seaside plant. Syn. *E. cordatum.*

E. atrorubens.—A hothouse plant and one of the finest of the genus, very useful for its reddish flowers in winter and early spring, and with handsome foliage. The thick woody stems bear a velvet surface of reddish-crimson which extends to the large rounded leaves as a soft rich coating. The widely-branched clusters are massive and conspicuous, their fine colour paling to a clear lilac when fully open. An old plant from Mexico, it was first grown in 1862 and is perhaps the best of the *Hebeclinium* section. It enjoys warmth in winter but at other seasons is more vigorous in an intermediate house. Young plants should carry only one cluster in their first season, but will bear many when well established.

E. Candolleanum.—A good but little known greenhouse plant, with pale green leaves and white flowers in heads like Ageratum, opening from December to early spring upon neat little bushes of about 2 feet, and lasting a long time even in rooms. Raised from cuttings in March, the young plants should be grown on in an airy house, with firm potting and abundant light; in the middle of August stand in the open for a few weeks to harden, giving more warmth after the buds are well advanced, according to the season at which flowers are required. Brazil.

E. cannabinum.— Hemp Agrimony, a native plant growing in rock or moist places as a tall perennial with stout stems, downy leaves cut into 3 to 5 narrow-toothed leaflets, and crowded heads of dull pale-purple flowers in summer and autumn. A handsome plant, well worth growing in damp places of the wild garden, from 3 to 5 feet high.

E. deltoideum.—A scarce greenhouse evergreen from the mountains of Mexico, growing as a branching tuft of about 4 feet, with downy triangular leaves, and pale mauve or purple flowers in tapering clusters.

E. ferrugineum.—A soft-wooded tender shrub from Brazil, best grown cool and freely stopped to keep it low ; if unchecked the long erect growths are ungainly in small houses. Large white flower clusters in early spring, a good succession to *E. riparium.* Syn. *E. Wendlandi.*

E. fruticosum.—A perennial sub-shrub with fleshy roots and hard grey stems, densely branched and clothed with stemless leaves of narrow-oval outline and glossy texture, and bearing loose heads of purple flowers during summer. Mexico. Syns. *E. canescens*, or *cubense*.

E. glabratum.—A shrubby Mexican species with slender erect stems, small oval leaves of thick texture, and white or pale pink flowers in tapering clusters. Syns. *E. elegans*, or *latifolium*.

E. glandulosum.—A Mexican plant grown in American gardens for its white flowers, of spreading habit, with hairy branches inclined to trail at the base, wedge-shaped leaves, and flowers in close heads like those of Ageratum.

E. glechonophyllum.—A woody evergreen of 3 feet or more, with downy stems, acute-oval leaves of soft texture and toothed edges, and loose clusters of about 30 white or flesh-pink flowers, opening from June to late autumn. This kind will bloom in the first year, if sown early and treated as an Ageratum. Sown later it may be used as a greenhouse perennial, flowering under glass in late autumn and early winter. Chili. Sometimes known as the Mint-flowered Eupatorium.

E. Haageanum.—An erect shrubby greenhouse kind from South America, with oval tapering leaves coarsely toothed, and small white flowers in loose clusters.

E. ianthinum.—A handsome hothouse plant shown in our coloured plate. It is a shrubby, sparsely-branched kind, with stout stems and large soft leaves, its violet-blue flowers opening in winter or early spring and keeping their beauty for many weeks. Its needs are rich soil, good drainage, and a winter temperature of about 60 degrees; drought, or too low a temperature, causes the leaves to fall. After flowering, the plants should be kept dry and cool as a rest before cutting back and repotting. A well-flowered plant is one of the handsomest of winter shrubs. Mexico. 1849. A variety with larger leaves, known as *panamense*, bears looser flower-heads of deeper colour. There is also a form, *marmorata*, with leaves finely blotched and variegated. Syns. *Hebeclinium*, or *Conoclinium ianthinum*.

E. japonicum.—A perennial coming very near our Hemp Agrimony, but with stems shorter and more branched, and white flowers opening later as a good succession until frost. Though hardy in the south, it needs protection in cold districts or a reserve under glass. Formosa and Japan.

E. Kirilowii.—A hardy perennial from North China, with downy stems of 2 to 3 feet, lance-shaped deeply-toothed leaves of soft texture, arranged in whorls, and heads of white flowers in autumn. Syn. *E. Lindleyanum.*

E. macrophyllum.—An old hothouse plant from tropical America, now scarce in gardens. It is too vigorous for small houses, with stout hairy stems of 4 or 5 feet and large rounded leaves upon long stalks and drawn out to a pointed tip. Their surface is deeply veined and of velvet softness, glistening with a reddish-purple sheen of beautiful effect. Flowers of reddish-lilac in a vast spreading head, coming in late autumn and winter. Syn. *Hebeclinium macrophyllum.* Culture as for others of the hothouse section.

E. micranthum.—One of the shrubby greenhouse section and a plant of many names of which *E. Weinmannianum* is perhaps the best known. A graceful and sweet-smelling plant bearing a profusion of white flowers from October until winter has well begun and one of the most useful of autumn bloomers. It is a strong grower, needing more space than other kinds for its erect willow-like shoots clothed with deep-green oval leaves. It is sometimes grown very prettily as a wall shrub in the open air of the south-west of England, or under glass in colder parts, being easily pruned back when too large. Under glass however it is best in pots and more easily regulated by " stopping " or a cool temperature ; if moved to a warmer house when coming into beauty, the flowers gain in purity and fragrance. The feathery white clusters are pretty arranged with scarlet Salvias or other bright blossoms, lasting well in water and drooping gracefully upon long light stalks. Mexico. There are two prettily variegated forms of fairly strong growth ; that known as *tricolor* is a striking plant with leaves marbled in yellow, white, and rose colour. Syns. *E. arboreum*, or *ligustrinum.*

E. Morrisii.—A stout evergreen shrub of rapid growth, reaching 6 to 8 feet in two or three seasons but easily kept low if desired. The long lithe flower-shoots take a graceful droop under the large thrice-branched clusters of white or pale pink flowers, freely produced in autumn and again in spring. The woody stems are of a warm red-brown colour and the leaves smooth and glossy, elliptic in shape, dull green above and paler beneath. A common shrub in gardens of the south of Europe, it is hardy at Cannes, and would probably do well in the open at the warmest points of the south coast, and elsewhere as a greenhouse shrub. Easily grown from cuttings which flower from a small size. Australia.

E. odoratum.—A strong shrubby kind and one of the oldest in gardens, useful for its winter flowers borne freely in a cool house. It needs constant "stopping," running up tall if left to itself, or when planted out. Flowers white, pale pink, or even pale blue according to variety, and very fragrant.

E. perfoliatum.—The Rough Wort. A hardy perennial, common upon low lands of North America, with stout rank-smelling stems of 3 to 5 feet, hairy wrinkled leaves, toothed at the edges and clasping around the stem, and dense clusters of 10 to 30 creamy white flowers of striking effect at the waterside. A good plant for the wild garden.

E. petiolare.—A charming greenhouse plant of recent introduction, shown in February of last year before the Royal Horticultural Society when it won an award of merit for its distinct beauty. Its habit is lax and freely branching, with large heart-shaped leaves, wrinkled and coarsely toothed, and a cloud of white flowers drooping prettily from the main stems and from every leaf axil in midwinter : so free is it that 36 heads were counted upon a little plant of 5 stems. The blossoms carry a strong smell of vanilla and last long in water, filling a large room with their fragrance. In the first stages the flowers are rosy but open to pure white and are likely to prove a gain to our winter flowers. In its second season, and grown in large pots, this makes a stout soft-wooded shrub of 5 or 6 feet, and very useful in the conservatory. Syn. *E. Purpusii.*

E. probum.—Belongs to the same section of winter-flowering greenhouse plants, coming after the early kinds and distinct from others. It is of bushy habit and seldom more than 18 inches high, with rough-edged light green leaves of heart-shape, covered on both sides with soft close down and somewhat sticky. The flowers are as large as a sixpence, pure white, and gathered into dense heads 6 inches or more across. Their size distinguishes this from any other greenhouse kind while their fine effect and long duration give it a peculiar value from January onwards, the first clusters being followed by a second crop of smaller flowers. One of the easiest to grow and inclined to flower when quite small. Peru.

E. purpureum.—PURPLE HEMP AGRIMONY.—A beautiful American plant of good effect in damp ground, growing 6 to 8 feet high, with stout brown stems and large broad leaves in tiers of 3 to 6 together, coarsely toothed and much veined. The flowers expand during August and September as broad heads a foot or more across and lasting for several weeks ; their colour varies from reddish-purple to pale flesh colour approaching white ; good effect depends upon choice of a good strain. Too coarse for the kept garden, it is good for bold effects,—hardy, vigorous, and at its best after a hot summer. Syn. *E. verticillatum.* Two distinct forms are grown in gardens : *maculatum* being a dwarfer plant with purplish rough-haired growths and heads of greyish-purple flowers ; and *amœnum*, only about 2 feet high, in which the hairiness almost disappears.

EUPATORIUM RIPARIUM.

E. riparium.—A graceful greenhouse plant much grown for its white flowers early in the year and useful as a room-plant. Its habit is low and spreading, not much influenced by "stopping" when grown cool, though its flowers may be hastened or kept back for awhile by change of temperature. It is one of the best kinds and though the flowers are small they are numerous and stand well when cut. Large trained plants are effective in the greenhouse for early spring, coming after *micranthum* and *odoratum*, with dark slender stems, neat narrow leaves of deep green, and the mass of compact white heads in telling contrast. A house just secure from frost and a copious supply of water just suit this graceful herb from the mountain streams of Mexico.

E. scandens.—A pretty little creeper with limp and glossy leaves of vivid green and heads of pale yellow flowers: better known as *Mikania scandens.*

E. serotinum.—A hardy perennial from Carolina, with stout stems of 3 to 4 feet, oval leaves coarsely toothed, and heads of small white or rosy-white flowers in late autumn. The large clusters are light and pretty for cutting and the plant of good effect in damp corners of the wild garden.

E. serrulatum.—A pretty winter-flowering greenhouse shrub of rapid growth and loose habit, with narrow short-stalked leaves and rosy flowers in dense rounded heads. Uruguay and Brazil. In the south of Europe this makes an effective flowering shrub, and of late years has been tried in the open air in the south-west of England and Ireland.

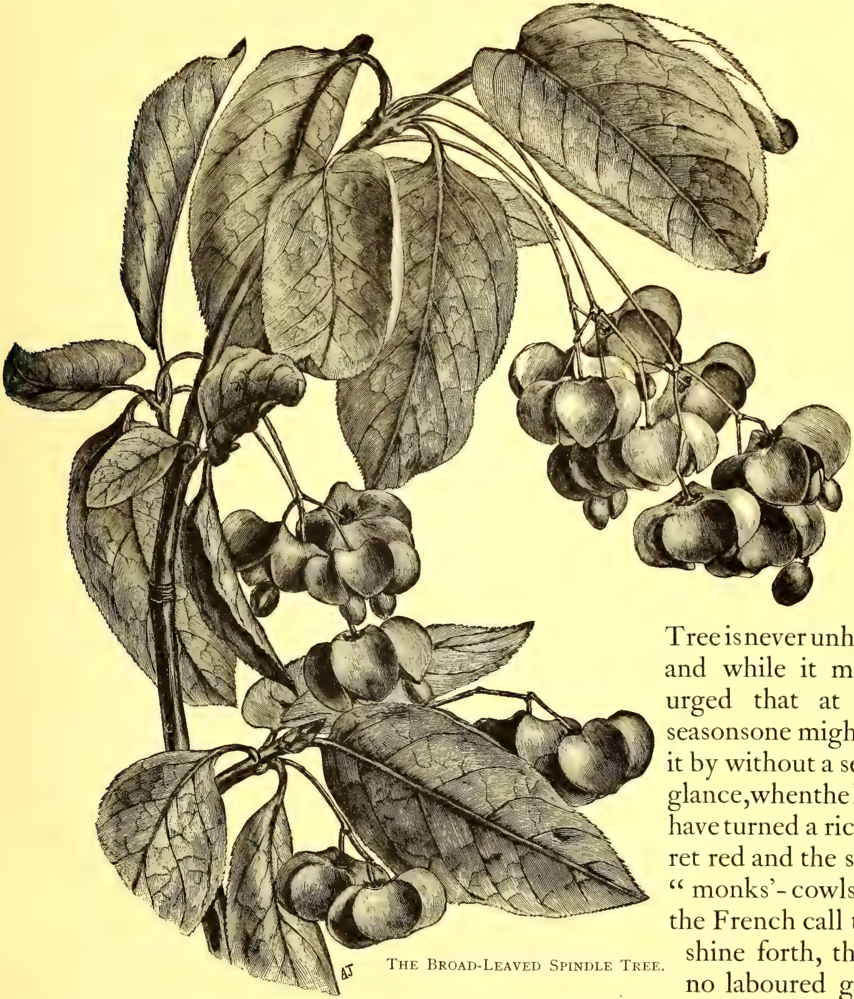
E. trapezoideum.—A stout shrub of rapid growth, rising 4 to 5 feet in a season as a bold bush with angular leaves and a multitude of little white flowers in flat clusters of 3 to 4 inches across. Easily raised from cuttings or seed, flowering in winter and early spring. Syn. *E. adenophorum.*

E. triste.—A strong greenhouse herb with hairy angular stems; broadly oval, hairy, and wrinkled leaves; and large erect heads of glistening white flowers. A little known plant from the mountains of Jamaica, which has recently gained favour in American gardens for pot-culture and cut bloom.

E. vernale.—Though this plant gained an award of merit from the Royal Horticultural Society last spring it has been in cultivation for many years, though mostly under the name of *E. grandiflorum.* It is of dwarf growth, often not exceeding 18 inches; with broad heart-shaped leaves of deep bronze-green, hairy, strongly veined, and whitish beneath; large branching heads of flower several inches across, coming early in January and lasting for a month or six weeks. On first opening, the flowers are pale pink from the colour of the long protruding styles, but with full expansion they become pure white, lasting well but too stiff for cutting. The plant is slower growing than most kinds, with rigid reddish stems; they flower well when quite small and may be grown on for several years without becoming too large. Mexico and Guatemala. Its many Latin names have caused confusion with this (as with many other) Eupatoriums: amongst its synonyms are *Brickellia grandiflora*, *Ageratum grandiflorum*, and *Conoclinium.* B.

THE SPINDLE TREE.

Among the pictures of the waning year there is little to compare with the autumn glory of the Spindle Tree, when, after such a season as that just closed, it flames forth with all its wealth of crimson capsules—"the fruit which in our winter woodland looks a flower," as Tennyson has it. A native shrub, the Spindle Tree is far from common in many parts of the country, though here and there more frequent, as in North Oxfordshire where it gladdens the eye on the skirts of many a woodland or the leafy walls of slumbering bye-ways. It has been said that the glory of rural England is its mossy lanes, and surely the winter glory of many a lane of Dorsetshire and Devon, and other parts of western England is due in great measure to the fine colour of *Euonymus europæus.* And yet how seldom is this hardy little shrub turned to account in our home woods, where its autumn glow might light up many a glade, flinging answer to the reddening sunsets of November in double-dyed reflections of its own. With the late spell of frost and snow the birds turned to the Spindle Trees, but not until their rich effect had won increasing admiration which culminated in that feast of red and white. More certain in its fruiting than the Holly, the drooping clusters of crimson—parted to show the orange-coloured seeds within, are still richer in effect, and while they often go to feed the birds at last, it is only after the autumn first-fruits are exhausted and the eye has had its reward. It is one of those easily contented wildlings to which all things come alike, sand or clay, moisture or drought, sun or shade; the Spindle Tree is never unhappy, and while it may be urged that at other seasons one might pass it by without a second glance, when the leaves have turned a rich claret red and the scarlet "monks'-cowls" as the French call them, shine forth, there is no laboured garden picture wrought out through months of toil and forethought that can put to shame this impromptu feast of colour.



The Broad-Leaved Spindle Tree.

Wherever a sunny glade or open space exists in woodland, there are few finer ways of giving beauty than by planting clusters of the Spindle Tree where their fruit will catch the autumn sunshine and where, from a moist bank, branch can hang over branch, giving cover, colour, and food for the pheasants at one and the same time. The young plants are cheap and easily established anywhere, doing well even in sandy soils, nearly evergreen in mild seasons, and spreading by suckers, though plants cut to a stem (and then allowed to take their own way) are the best for effect, rising at length to 20 feet or more and loaded down with berries in the autumn. A varied effect is gained by planting here and there the pretty forms with purple, white, or scarlet fruits:—*atropurpureus* (quite distinct from the tender American species of that name) has larger purplish leaves and fruits of wine-red colour; *leucocarpa*, in its many pale-fruiting varieties with leaves of brighter green, and the best, with fruits of clear ivory white, as beautiful as it is uncommon; *coccinea*, its heavy clusters approaching scarlet; and other leaf varieties of minor interest. Or the more tree-like Broad-leaved Spindle Tree (*E. latifolius*), from the Rhine valley and parts of southern Europe, may find a place for its distinct beauty. Its leaf is often 5 to 6 inches long and wide in proportion, of a more brilliant green and covering a thickly branching rounded head. The fruits are also larger, of more glowing red, and hung upon slender stalks of several inches, which droop beneath the weight and tremble prettily at every breath though often hanging thus for weeks. This also is a charming tree in autumn, needing more space than the common kind and better with a little more shelter, but just as freely fruiting and rich in colour when well established. Even in winter its bare stems give distinct shades of reddish-green bark, tipped with long pointed buds of deep dark brown—not much you say, and yet these wintry touches, hidden from our eyes the summer through, are precious to the child of Nature.

RUSTICUS.

A GARDEN ALLEGORY.

Of late, while visiting a neighbour, I chanced upon a stranger buying plants, and upon exchanging a few words, was flattered to find that he knew my passion for gardening, and seemed so drawn to me as to wish to share the joy of his own garden. Now, in general, I avoid those beyond the circle of my immediate acquaintance; but the seashore, a river bank, a streamlet, a mountain, a forest, a tree, or a flower, has always its attraction for me; so I accepted the invitation and fixed a day.

True to time I reached the spot and was received correctly enough, but had hardly set out upon what was plainly an habitual round of self-satisfaction, before I realised that my host was not a gardener or even a lover of flowers, but a collector, and of the meanest stamp. His was one of those natures that rejoice little in the beauty of tree or flower, save the faint joy of its possession, but find their delight in the fact that, being rare, few beside themselves can enjoy it, while their supreme satisfaction lies in luring others to admire and vainly desire, in order that they may be turned away sorrowful. I felt myself a victim, a prey to this unholy satisfaction, and my heart rose in revolt; none the less, being careful of happiness as of something akin to sacred, and not to be lightly marred under whatsoever guise it exists, I resigned myself with the thought that, if such were his pleasure I would let my host taste it to the full. Now, when free to follow my own course, I like at the outset to get an impression of a garden in its general character and grouping, coming by degrees to the details of tree and flower; but here the programme was already fixed and the ordeal began. "Pray do not hurry, we may miss things of interest; here, for instance, is a Dasylirion, which, I venture to say, you have seen nowhere else; true, it is not unlike older kinds, but it is quite a new plant—*Dasylirion glaucescens*—and should on no account be confused with them." Strong with my inward resolve not to spoil his pleasure, I took notice of it. "Ah! here we have a *Cocos campestris*, which is fully 18 inches taller than the plant of M. Mazel of which he is so proud; and what do you say to this *Xeronema Moorei?* I paid 200 francs for one small root which will not flower for another two years, but it is most rare. This also is not much to look at as yet, but is a treasure—it is a *Cyphosperma*. Perhaps you have heard Viscount —— boast of his fine Palms, which he will call *Phœnix reclinata*, whereas anyone may see that they are nothing but *Phœnix tenuis;* I admit that *tenuis* is the better plant, but they are not the same thing. Now, here is the true *Phœnix reclinata*, not like the over-fed trunks of my neighbour, but the real thing. Ah! when shall I forget his look upon seeing my *Cyphosperma;* but come along, the path is steep, but we shall be rewarded by seeing a superb Araucaria." Now I am not fond of the Araucaria, and felt impelled to say so. "You do them injustice, but of course you have not seen *mine*." "And your Roses?" I ventured. "Roses—oh yes, there are some here and there we may see in passing; but after all, what is a Rose? I call them a cottager's flower." Could I do other than resent this irritating slight of the poor man and his flowers? I hardly saw a *Croton elongatum* next pressed upon my admiration, and was again hurried forward to another idol, a Banana. "Perhaps the *Musa ensete* with its fine leaves," I suggested. "Oh no, not that; I had one—the finest you have ever seen—but have lost it; this is *sinensis*, but a form of my own which ripens its fruit in the open air.

Again we neared the house, but, spite of the heat, my tormentor was too intent on pleasure to think of rest, and continued: "See this superb Agave—I have heard that those of Villa Thuret are as good, but I don't believe it." "Those at Antibes are fine, have you seen them?" "Not I; I have heard too much of them to wish to see them"—and our walk began afresh. Stooping for a moment to admire the flower of a beautiful little rock-plant, my host broke in upon me, "Ah, that is *my* Mesembryanthemum—you will not find that anywhere but in this garden." It was charming—a little rosy star glistening with silver sheen, and planted by the thousand as a flowery carpet. "It is the *M. deltoides*," he continued; "one of my friends here thinks that he has it, but his is only *M. caulescens*—a common plant; I am sure you have not this in your garden." And then, lest I should ask a fragment of his thousand plants, and so mar the sweetness of its sole possession—"But come, see a *Pritchardia* of which you may boast never to have seen the equal." I struggled inwardly—should I not teach the man a lesson? So, still looking at the little sun-plant, I continued—"Your little rosy Mesembryanthemum is almost as lovely as my blue one." "A *blue* one! there is no blue one"; and then began a dialogue by which, spite of himself, my man was forced to believe that such a flower existed, though only in my garden, where I had cherished it for years; and as I told of its beauty and fine colour, my guide became silent and crestfallen. I had something that he lacked, and the thought was bitterness; and when I took my leave, I knew that to him there would be neither rest nor pleasure until he finds the blue sun-plant. He may wait and search, but will not find it, for it exists but in my own imagination, invented that he might taste something of the measure with which he metes. ALPHONSE KARR.

GARDEN CITIES: A STUDY OF PARKS, GARDENS, AND CULTURE INSTITUTES. BY PROFESSOR GEDDES, EDINBURGH.

WHEN the Carnegie Dunfermline Trust resolved to lay out their park, they entrusted to Professor Geddes the work of reporting as to the best way of setting about it, and no better choice could have been made. Unfortunately, a spirit of open frugality seems to have presided at the birth, and the report exhibits all the worst vices of most modern books, as well as several others due to haste. The compiler of a report like this is, of course, not the master of his ways and means, and the time allotted to him for his task is generally much too short, so that it would be unfair to blame Professor Geddes for any hand in the crude photographs, the mean, hard print, or the tinshiny paper which is itself an eyesore in more ways than one. It is a very precious thing to be able to try and develop the beauty of one's city, and while we congratulate the reporter on the zeal and ability which are embodied in his suggestions, we think a report like this, which must stand as a record of important work, deserved a better fate than that of being illustrated with bad photographs poorly printed on glazed paper. The modern printer often looks upon a book got up in this way as a triumph of that "evolution" of which we hear so much nowadays, being ignorant, perhaps, of the fact that he is going back to utter badness of type, paper, and effect of page. The talk of garden city companies is one of the most foolish ideas perhaps ever emitted, because our country is full of beautiful garden cities already, which only want developing. Still, good must come of it, and we see some of the fruit in this book, showing what may be hoped for in one of these Scotch cities which are not always remarkable for beauty. There is no doubt an enormous deal of beauty and convenience lost by cities not being carefully thought out at first. Those concerned with the improvement of cities should not limit their range of view to what is done in England, because we see in London and elsewhere fine opportunities neglected. Paris is an example of a well-planned city; but we think the German cities, where not nearly so much noise is made about improvements, are fully as well worth seeing. Only this year Dresden struck us very much in many ways, particularly its arrangement of airy streets, perfect paving and footways, and cleanliness. As regards the particular subject of this book, it is difficult for one who does not know the situation to give other than a general opinion.

ENGLISH ESTATE FORESTRY. By A. C. Forbes. (Edwin Arnold.)

The author of this book is Lecturer on Forestry at the Durham College of Science, and was formerly Forester at Longleat; he ought, therefore, to know his subject well. In the first chapters he reviews the past, present, and future of English forestry: the remainder of the book deals with such subjects as timber, trees, and methods of growing them, woodland work and working plans, landscape forestry, and park timber. The book is illustrated by rather poor photographs on the now usual shiny paper. Like so many of the recent books on forestry, the language used is neither simple nor clear, the free use of such new words as "sylviculture," "arboriculture," and the like, leading to English which is far from pure, and words about "ornamental" woods, "sylvicultural" woods, and "arboricultural" woods, only confuses a very simple subject. Some of the most beautiful trees are those that are grown solely for timber, as we see them in Scotland, Germany, and France—as in the forests of Bercy, Marly, and Fontainbleau. As to draining, we notice with pleasure that the author makes a mild protest against the waste in that way, the right plan being to grow the trees that suit the conditions of soil, and not to drain beyond making open "dicks" in bad places. The author doubts (p. 62) whether the Oak is worth growing as a timber tree for profit, because, as he says, "it is a slow-growing forest tree"; but there is evidence to show that in good Oak-growing districts it is a quick-growing tree, there being no wood grown in Britain that gives so certain or so good a return. Like many other modern writers, he is very happy with the big word "evolution," even to speaking of the "Evolution of the Estate Forester." To return to the question of "ornamental woods"—as if all woods were not ornamental in the best sense; many woods which are entirely regarded for their timber value, are beautiful whether viewed close at hand or otherwise. Upon the vast uplands planted for timber in Bavaria and Bohemia, the beauty imparted to the landscape by the forests is extraordinary, whether upon mountain, moor, or poor hill-land; this is a far nobler beauty than is ever obtained by the so-called "*ornamental*" planting, which too often makes for ugliness, with its stuck-about and isolated trees. A good handbook of forestry should strive to show the unity of woodland work, rather than use words of foreign origin and misleading attempts at definition, which are confusing to the beginner when the difference, if any, is only one of degree. The phrase "*Estate-forest*" implies that there is another kind of forestry; whereas there is only one forestry, be it on 50 acres or 1,000, on a gentleman's estate or on a wild mountain side.

FLORA
AND SYLVA.

Vol. III. No. 23.] FEBRUARY, 1905 [Monthly.

HIMALAYAN RHODODENDRONS IN THE SOUTH-WEST.

THROUGH the greater part of this country lovers of the Rhododendron in the open air have to be content with the beauty of the hardier hybrids, and the much over-planted *R. ponticum*. In some portions of the kingdom, however, such as the coast of Wales, the south of Ireland, the west coast of Scotland, and the southern shores of Devon and Cornwall, the noble Himalayan species and hybrids may be enjoyed in all their beauty of flower and foliage, growing as freely as in their own country. But perhaps the conditions are nowhere so favourable to their well-being as in the south of Cornwall, a locality rendered genial by the slow drift of the Gulf Stream up its coast, rich in atmospheric moisture, and sheltered from the biting winds that sweep the higher land to the northward. Here they may be seen in all their loveliness, and it is difficult to imagine anyone who has shared that privilege agreeing with the statement of the author of an article on Himalayan Rhododendrons in *The Garden*, some years back, that, "It is when treated as conservatory plants that they are seen to the greatest advantage." So far from this being the case, where these Rhododendrons can be seen in their natural beauty, they are the most glorious of all flowering shrubs of the open air. Nothing in the floral world can be more lovely than the giant bushes, often 20 feet or more in height and as much in diameter, loaded with countless trusses of pink, crimson, or white blossoms, glistening in the sunshine of a windless April or May morning.

Himalayan Rhododendrons require shelter, which is best afforded by trees at a little distance. From what I have seen in gardens of the south-west, I think that they dislike overhead shade, and are less vigorous and bear fewer flowers when overhung by trees than when nothing comes between them and the sky. The spot at Tregothnan where the finest of the Himalayan Rhododendrons are growing is an ideal site, sheltered by trees on all sides, but fully open to the sky above. Here the Rhododendrons are of great size, flowering abundantly, and of perfect shape. As regards soil, peat is certainly the best for Rhododendrons, but, if lime be absent, they will succeed in most soils. In light and moderately heavy loams they are often to be met with in the best of health, and at Tremough, where the gardens contain what is perhaps the finest collection of Himalayan Rhododendrons and their hybrids in the British Isles, the gravelly subsoil is eagerly laid hold of by the tiny rootlets.

In starting a collection of Himalayan Rhododendrons special care should be exercised in the provision of suitable soil and selection of favourable sites. The soil should be dug out to a depth of 2 feet or 3 feet and peat substituted for it, so that the young plants may, in the first instance, find a soil they are partial to, in which to grow and gather health and vigour, before their roots enter the natural soil below, which may or may not prove agreeable to them. As regards sites, there is no doubt that protection, especially from the north and east, is indispensable, for cold gales are most harmful to tender Rhododendrons, indeed strong winds from any quarter are best guarded against. A sunny glade, sheltered on all sides, particularly on the north and east, by evergreens such as Ilex or Holly, would afford all the conditions necessary to the growing of Himalayan Rhododendrons to the best advantage, but, though the protection of trees is most valuable, their branches should never be allowed to directly overhang the plants.

In sheltered spots near the south coast of Cornwall and Devon, these splendid flowering shrubs may be met with in the best of health; and further east, in the Earl of Ilchester's noted gardens at Abbotsbury Castle, Dorsetshire, many fine specimens may be seen, which, probably, owe their well-being to the shelter-belts of Ilex that screen the gardens. It being proved that these Rhododendrons may be grown successfully in each of the counties named, it follows that their culture might be considerably extended in the same district, provided sufficient care was taken to ensure that the sites selected were well-fitted to their requirements.

Lovers of Rhododendrons, who are anxious to study all the species and varieties in flower, would need to arrange for an eight months' stay in southern Cornwall, or to pay the county a series of visits extending over the same period, for the first to flower, *R. nobleanum venustum*, often commences to flower at Killiow in October, while *R. Dalhousiæ* and *R. Nuttalli* rarely blossom in the open before the first week of June. *R. grande* flowers from February to March, the *R. arboreum* section is at its best in April, while *R. Griffithianum* and *R. Falconeri* bloom in May. Among the species I have more particularly noticed are :—

Rhododendron arboreum.—This species is variable both in its foliage and in the colour of its flowers. In one form the leaves are silvery on the under sides, while in another they are covered with a brownish-red down. The blossoms, which are bell-shaped and carried in dense trusses, vary from deep crimson to pure white. At Tremough *R. arboreum roseum* is 26 feet in height and over 30 feet through. The trunk of this monster divides into three a little above the ground, the largest of these stems being over 3 feet round. Close by stands *R. arboreum cinnamomeum*, about 20 feet in height. Bushes of *R. arboreum album* at Tremough are 16 feet in height. At Carclew there is an enormous specimen of *R. arboreum* fully 35 feet in height and over 4 feet in girth of trunk. Of *R. arboreum* there are hybrids almost without number, many being very beautiful. At Trebah, a pale pink variety of this species is often a mass of bloom in February. A very common Rhododendron in South Devon and Cornwall, which grows into a huge bush and bears deep rose-red flowers, is evidently allied to this species.

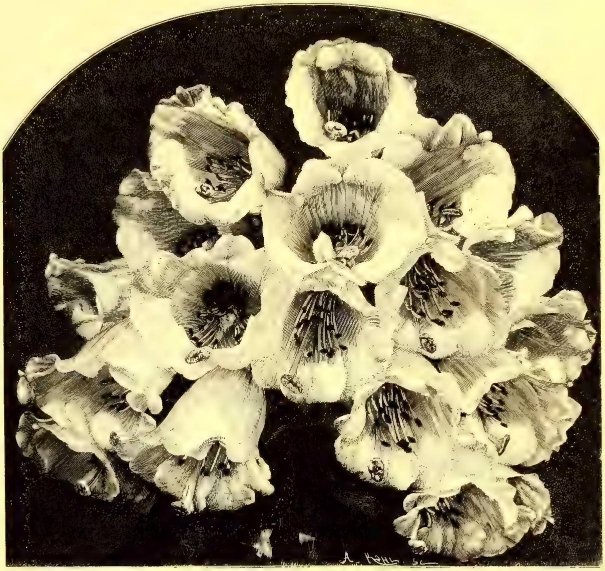
R. barbatum.—A shrub deriving its name from the black hairs that clothe the petiole. Its blood-red flowers, borne in a close truss, are 1½ inches across the cup, and its leaves about 6 inches long. There are many fine examples in the south-west, one, at Tremough, being 16 feet in height and 24 feet through. In the same gardens there are many varieties of *R. barbatum* (evidently crosses with *R. arboreum*) which deserve naming. They generally lack the hairy appendages on the petiole. Some are very beautiful, a fine bush of a flesh-coloured form of *barbatum* being especially good.

R. calophyllum.—A fine, large-flowered species, met with in a few collections. Its flowers are 4 inches across and are white, tinged with yellow at the base of the tube. The glossy-green leaves are about 5 inches in length.

R. campanulatum.—This is considered to be hardier than most of the Sikkim Rhododendrons. Its flowers vary in colour from pale purple to white slightly tinged with lavender, and its leaves are coated on the under side with reddish down. There is a good specimen, about 12 feet in height, at Trewidden, Penzance. A form known as *Wallichi* has brighter flowers than the type.

R. campylocarpum.—A very beautiful species and fairly hardy, bearing pale yellow, slightly fragrant flowers about 2½ inches across, carried in loose trusses. Its leaves are about 3 inches in length and 2 inches in breadth, and are glaucous on the under sides. The foliage is very distinct. This Rhododendron is an abundant bloomer, bushes being often so covered with blossom that scarcely a leaf is visible. Associated with the vermilion-flowered *Embothrium coccineum* it forms a striking picture. The largest bush that I know—at Whiteway—is 9 feet in height and 9½ feet through; but there are many fine plants in other gardens.

R. ciliatum.—A somewhat dwarf-growing species, bearing pinkish-white flowers under 3 inches across, in small, loose trusses. A free-flowering kind, from which a number of hybrids, such as *R. præcox* and others, have been raised. The largest bush I have seen is growing at Tremough, and is over 6 feet in height and 18 feet through.



Rhododendron Falconeri.

R. cinnabarinum.—A species bearing long, tubular flowers of cinnabar-red tipped with yellow, but most variable. The variety *Roylei*, of which there is a fine bush at Enys, bears small flowers of a soft reddish-pink, the waxy petals being covered with a grape-like bloom. *R. Blandfordiæflorum* is now classed with this species.

R. Dalhousiæ.—This is rarely met with in the open. I have seen it at Tremough, growing close to a wall, about 7 feet in height, bearing in the first week of June its yellowish-white flowers, some 4 inches across.

R. Falconeri.—A very striking plant with leaves often over a foot long and 6 inches wide, corrugated on the upper surface and covered beneath with cinnamon-tinted tomentum. It bears its tubular, white flowers in compact trusses, as many as 30 being sometimes carried in a single truss. The noblest specimen known to me is at Tregothnan, where, last year it measured 22 feet in height and 30 feet through. It is of perfect shape, and clothed with foliage down to the ground on all sides. In 1902 it bore over a thousand flower-trusses. *R. eximium* is a form of *R. Falconeri*, with pink flowers and a thicker downy coating on the under sides of the leaves, this appearing more thinly upon the upper surface also.

R. Fordi.—A species discovered by Mr. Ford, curator of the Hongkong Gardens : it bears white, rose-tinted flowers 2 inches across.

R. fulgens.—A nearly hardy species similar in foliage to *R. campanulatum*, bearing small, compact trusses, about 4 inches across, of bright red, shining flowers. It blooms sometimes before *R. arboreum.* Bushes 10 feet high and as much through, are at Tremough.

R. gloxiniæflorum.—Introduced by the late Mr. Robert Veitch, of Exeter, hardier than most Sikkim Rhododendrons, bearing large, waxy-white flowers with a few purple spots in the interior. There is a bush at Whiteway about 10 feet high and as much through.

R. grande.—This is better known by its old name of *R. argenteum*, a title justified by the silvery under side of its leaves, which are often over a foot in length. It is a handsome kind, bearing somewhat loose trusses about 10 inches across, of white, bell-shaped flowers 2½ inches in diameter. These are at first suffused with a faint rose tint. At the base of the cup are purple blotches. In some forms the anthers are crimson-tipped. The finest I know is at Tregothnan. This is 16 feet in height and about 20 feet through, and in 1902 bore over 300 flower-trusses. Some variation in the time of blooming appears to exist, as at Trewidden it flowers in January and early February, while at Tregothnan it was at its best in 1902 towards the end of May. Our engraving, so finely done by M. Pochon, is from a drawing by Mr. Moon.

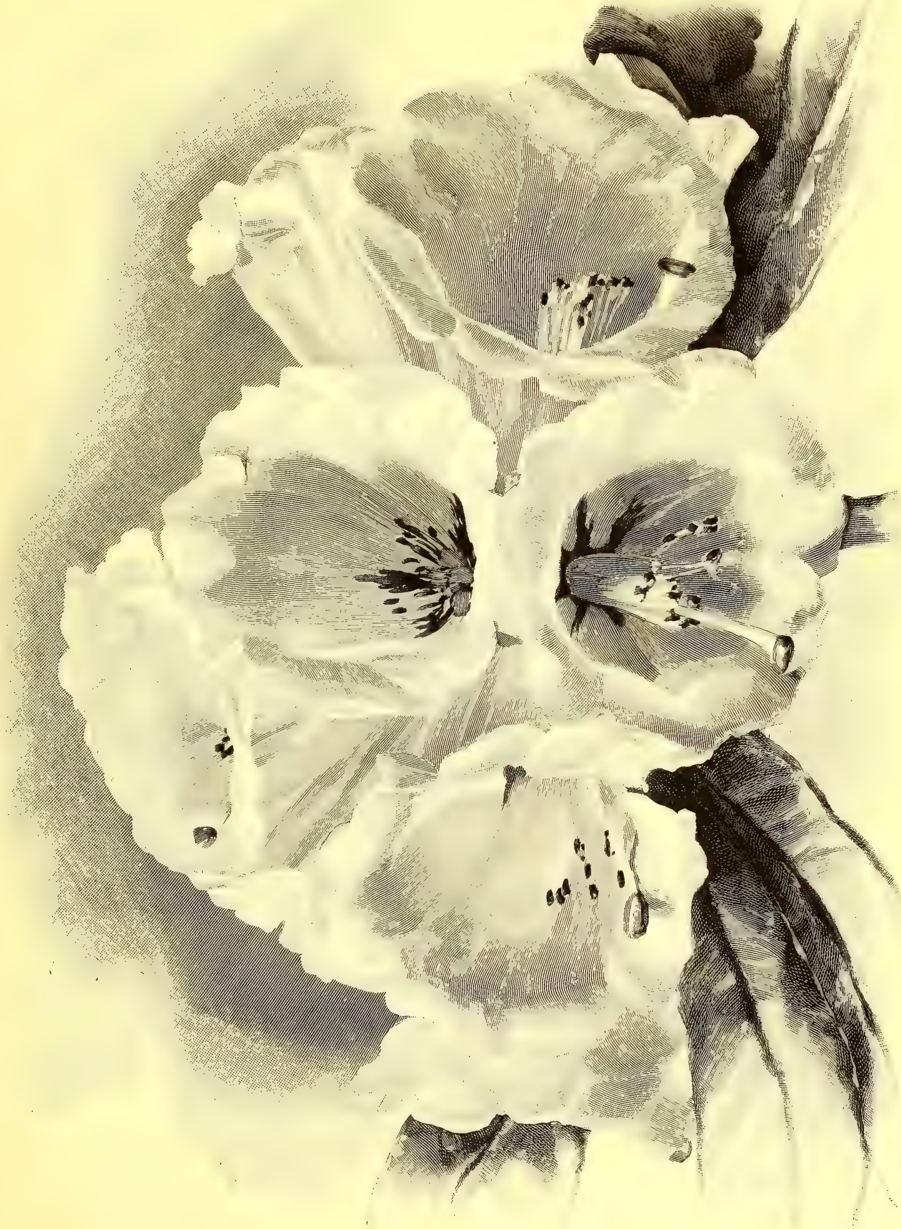
R. Griffithianum.—Much grown in the south-west as *R. Aucklandi*, and the noblest kind of all. The late Rev. Henry Ewbank, of Ryde, Isle of Wight, writing of it a few years ago, described it as "the glory of the Himalayas, and queen of all flowering shrubs." Its narrow leaves are often nearly a foot in length and of a rich and glossy green. Its great, pure-white, widely-open flowers often exceed 5 inches in diameter, and I have counted as many as nine in a single truss. The finest specimen that I have met with is growing at Killiow, near Truro, and is about 15 feet in height and 22 feet through. This is probably the finest plant of its kind in the British Isles. It was planted in 1864, so has been forty years in its present home. This form has a deep carmine spot at the base of the anthers and is a picture of marvellous beauty when smothered with its large white blossoms in May. Many gardens, such as Menabilly, Trebah, and others, possess rose-coloured forms of *R. Griffithianum.* This kind is, for the first twenty years of its life, one of the quickest growers, as is shown by the great bushes raised from seed at Tremough during the past twenty years. It is a tender species, Mr. Ewbank having twice lost it even in the Isle of Wight.

R. Hodgsoni.—A plant with leathery leaves a foot long, covered beneath with grey down and bearing rosy-purple flowers.

R. nilagiricum.—Now considered as a form of *R. arboreum.* It bears cone-like trusses of bell-shaped flowers, soft rose in tint.

R. niveum.—This owes its name to its young leaves being of silvery whiteness on both sides, but when fully developed this colour is only seen on the under side. The flowers are of an unpleasant magenta colour. At Tremough there is a plant 15 feet high and of a like diameter.

R. Nuttalli. — A particularly handsome species, but rarely grown in the open. The flowers often exceed 5 inches in diameter, and are pure white with a yellow shading at the base of the cup. The splendid truss sent from Scorrier House to the Truro Show of the Cornwall Daffodil and Spring Flower Society three years ago, was one of the sights of the exhibition. This species has flowered in the open against a wall in the garden of the Hon. John Boscawen at Tregye.



RHODODENDRON GRANDE. *Engraved for "Flora" from a drawing by H. G. Moon.*

R. racemosum.—A dwarf-growing shrub from Yunnan, with small, white, pink-edged flowers about an inch across. A very free-flowering and attractive little plant.

R. Thompsoni.—Bears loose trusses of widely-spread deep crimson flowers 3 inches across, and leaves about 4 inches long and grey underneath. There is a bush 14 feet high and more in diameter at Tremough, where there are also many fine varieties of the same species.

R. triflorum.—This, although its flowers are of a deeper yellow than those of *R. campylocarpum*, cannot compare with it in beauty, its flowers and trusses being small and often scanty. Its foliage is not unlike that of *R. cinnabarinum.*

Hybrids.

Since the introduction of the Himalayan Rhododendrons much has been done in the raising of hybrids and, although these efforts are not always successful, a number of fine plants have been raised. Among other raisers of new forms in the south-west the late Mr. Luscombe of Coombe Royal, near Salcombe, obtained several charming varieties. The late Mr. Shilson was also interested in this work, which has now for many years been carried on with much success by Mr. R. Gill, head-gardener at Tremough. Some of the finest hybrids I have seen are :—

R. Ascot Brilliant.—A hybrid of *R. Thompsoni*, bearing rich scarlet flowers with widely expanded mouths. One of the brightest of all Rhododendrons.

R. Beauty of Tremough.—Raised by Mr. R. Gill. It is one of the best hybrids of *R. Griffithianum* and a cross between that kind and *R. Thompsoni.* Its flowers are of deep rose tint and about 4½ inches across. At the Truro Spring Show in 1902 it was awarded the first-class certificate of the Royal Horticultural Society.

R. Duke of Cornwall.—A cross between *R. arboreum* and *R. barbatum* also raised by Mr. Gill, and bearing rose-crimson flowers about 4 inches across. At the Truro Show of 1904 this obtained the first-class certificate of the R.H.S., though the flowers that gained the award were considerably smaller than those on earlier trusses which had faded at the time of the show.

R. Francis Thistleton Dyer.—Raised by Mr. Luscombe from *R. Fortunei* and a garden hybrid; bears large trusses of pink flowers with blotches in the throat.

R. Gauntletti.—A cross between *R. Griffithianum* and *R. ponticum*, but showing no trace of the latter parent. The flowers are pale pink changing to almost white, and nearly 5 inches across. Fourteen blossoms have been borne on a single truss. A fine variety.

R. Harrisi.—A cross between *Rs. Fortunei* and *arboreum*, with handsome foliage more pointed than that of *R. Thompsoni*, though the crimson flowers resemble that kind. It was raised by Mr. Harris in South Wales and bears his name. Mr. R. Gill also raised this variety and sent it to Kew shortly after it had been named.

R. Kewense.—A hybrid between *R. Griffithianum* and *R. Hookeri*, bearing, usually, pale rose flowers turning to white, though individual specimens produce bright rose blossoms.

R. Luscombei.—Raised by Mr. Luscombe from *R. Fortunei* and *R. Thompsoni.* The flowers are clear rose with reddish-brown spots on the upper petals, 3 inches across, and carried in loose trusses. In *R. Luscombei splendens* the blossoms are deeper in hue.

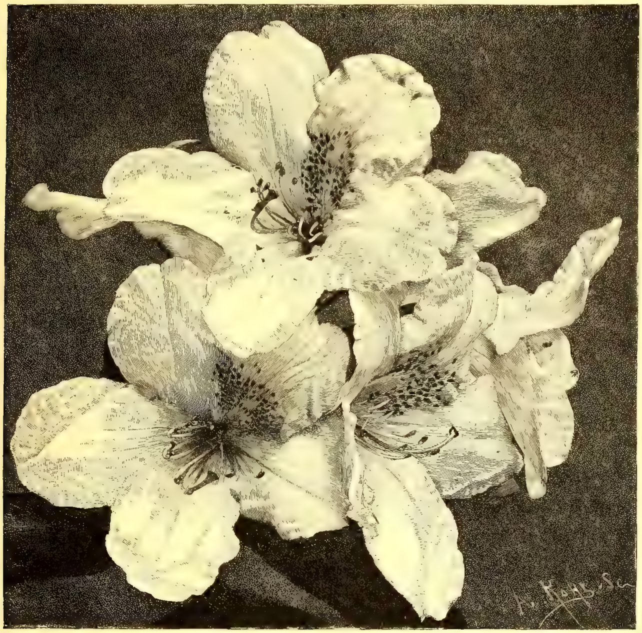
R. Manglesi.—Raised by the late Mr. Mangles. It bears tapering trusses of large white flowers suffused with pink and heavily spotted about 4 inches across. It is a good grower and free flowerer. There is a fine example at Penrose. It is a cross between *R. Griffithianum* and a garden hybrid named *album elegans.*

R. Mrs. Henry Shilson.—A plant of unknown parentage, raised at Tremough. It bears large trusses of soft-pink, bell-shaped flowers of great size.

R. nobleanum.—A very old hybrid, raised at the Knap Hill Nursery over seventy years ago from *R. arboreum* and *R. caucasicum.* It bears close trusses of deep rose-red flowers. It is well-known throughout the south-west and is the first of all the Rhododendrons to flower.

R. Pink Pearl.—A beautiful variety evidently related to *R. Griffithianum*, bearing clear pale-pink flowers, slightly spotted on the upper petals and 4 inches across. Small plants are now to be seen in many gardens of the south-west.

R. Pride of Penjerrick.—A cross between *R. Griffithianum* and *R. Thompsoni*, bearing pale rosy flowers lighter in the tube, with a spreading cup 3 inches in diameter. It was much admired at the Truro Show of 1903 and was raised by Mr. Gill.



RHODODENDRON MANGLESI.

R. Shilsoni.—Raised by the late Mr. Shilson as a cross between *R. barbatum* and *R. Thompsoni*, and sharing their character. It bears rich red flowers, deeper in tint than those of *R. barbatum* and about 2 inches across. The largest plant at Tremough is 15 feet in height and as much in diameter.

While in the south of Ireland last spring I saw a very handsome hybrid between *R. Nuttalli* and *R. Edgeworthi*, with loose trusses of pure white flowers.

TENDER RHODODENDRONS.—The distinct class of so-called Greenhouse Rhododendrons —of which *R. Edgeworthi* is an example— bear wide-spread, fragrant flowers of less consistency than those of the Himalayan species and their hybrids, and have rough and wrinkled foliage. Even in the south-west they are generally grown against walls. In the gardens at Trebah, however, there are several fine hybrids of this class growing as bushes in the open. These include *R. fragrantissimum*, 7 feet in height, *R. Gibsoni* and *R. Countess of Sefton*, 6 feet by 6 feet, *R. Lady Alice Fitzwilliam*, 5 feet, and *R. exonensis*, 3 feet high and 5 feet through. These are worthy of wider trial as bushes in warm and sheltered nooks in the south-west. There are several fine collections of Himalayan Rhododendrons and their hybrids in this district. The best known are to be found in the gardens of Tremough, Saltram, Whiteway, Tregothnan, Menabilly, Trewidden, Killiow, Trebah, and Enys. Tremough dates its beginning as a Rhododendron garden from the time when Sir Joseph Hooker was in the Himalayas and sent to the late Mr. Shilson, owner of Tremough, seeds of the various species collected by him. Plants raised from these gave a start to the splendid collection now to be seen there. In this practically all the known species are represented, as well as many hybrids which, under careful cross-fertilisation, are constantly growing in number. There are many forms of *R. arboreum* ranging in colour from the deepest crimson, through rose, pink, and flesh tints, to the purest white, and sometimes beautifully spotted. In the Earl of Morley's gardens at Saltram, near Plymouth, the collection includes Rhododendrons *Thompsoni*, *Kewense*, *Pink Pearl*, *Fordi*, *Francis Thistleton Dyer*, *calophyllum*, *Hexe*, *racemosum*, and many others. At Whiteway, near Chudleigh, South Devon, also the property of the Earl of Morley, the woods are planted with Himalayan Rhododendrons some of which are 30 feet in height, while many fine plants are growing in the gardens. These comprise, amongst others, Rhododendrons *campanulatum* and its variety *Wallichi*, *campylocarpum*, *cinnabarinum Roylei*, *Blandfordiæflorum*, *triflorum*, *fulgens*, *nilagiricum*, *Coombe Royal*, *Mrs. Butler*, the bright crimson *R. Brayanum*, *Broughtoni*, *Ascot Brilliant*, the blush-spotted *Standard of Flanders*, *gloxiniæflorum*, and *Black Arab*, with flowers of deep maroon-red. The splendid specimens of *R. Falconeri* and *R. grande* in Lord Falmouth's garden at Tregothnan—probably the finest of their species in the British Isles—have been already quoted, as has the remarkable plant of *R. Griffithianum* at Killiow.

S. W. FITZHERBERT.

RHODODENDRON DALHOUSIÆ.*

The plant shown in our coloured plate is one of the most beautiful and interesting of Himalayan Rhododendrons, from the size and fragrance of its flowers and its peculiar habits of growth. A native of damp forests of the Eastern Himalayas, at elevations of 6,000 to 9,000 feet, it is found growing upon the trunks of large trees, and rooting in the masses of decayed leaves, mosses, ferns, and other debris which accumulates in their branches. These conditions seemed to make its success in this country doubtful, but three years after its introduction a small seedling plant, grafted upon the common Rhododendron, flowered in the collection of the Earl of Rosslyn at Dysart House. Since then the plant has been grown in many parts of the country, but is still far from common. Its habit is straggling and needs training to secure an effective plant. If left to themselves, seedlings will often run up a stem of 3 or 4 feet without a break. In its own country it is seldom more than 6 or 8 feet high, but is often larger under cultivation. I have seen a fine plant at the Botanic Gardens, Birmingham, over 14 feet high, and when in full beauty bearing over 100 heads of flower whose fragrance filled the house. On first opening, the flowers are of a pale yellowish-green, but quickly become a rich yellow and give off their strong fragrance which lasts for several days. The flowers keep their colour while the scent lasts, and then slowly change to almost pure white before fading. The waxy bells are quite small upon first opening, but grow until the fully expanded flowers are from 4 to 5 inches in length, and about the same across the mouth.

Hybrids.

Several beautiful hybrids have been raised between this and other Himalayan Rhododendrons. The well-known *R. Countess of Haddington* is a cross between our plant and *R. ciliatum*, from which it has taken its neat habit. The flowers are lilac-pink in colour, with the size and fragrance of *R. Dalhousiæ*. *R. Dalhousiæ* var. *hybrida* is from a cross with *R. formosum*. Its flowers are very near those of our plant in size and shape, but are mostly pure white, with sometimes a tinge of pink along the centre of the petals. The habit of the plant is midway between that of the parents, and the foliage intermediate in size and quite smooth. *R. victorianum* is the result of crossing *R. Dalhousiæ* and the closely

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* With coloured plate from a drawing by H. G. Moon at Kew.

allied *R. Nuttallii*, and differs little from *Dalhousiæ* save in its slightly larger leaves. Since the introduction of *R. Dalhousiæ* several other kinds with the same peculiar habits of growth have been brought into cultivation, amongst them *R. ciliicalyx*, *R. Edgeworthii*, *R. formosum*, *R. Lindleyi*, *R. Nuttallii*, and *R. veitchianum*, all of which grow under similar conditions and require the same culture.

CULTURE.—The conditions best suited to indoor Rhododendrons are a large airy structure, allowing free ventilation during summer, and with a row or two of pipes round the house to keep out the worst of the frosts. In most parts of the country fire-heat is necessary during midwinter, but only enough to keep out sharp frost. Many kinds indeed will stand 10 or more degrees of cold without harm, but others, and especially the group to which our plant belongs, are ruined with more than 5 to 7 degrees. Fire-heat therefore becomes necessary when the thermometer shows something less than 5 degrees of frost inside the house. Where they can be planted out under glass, many of the stronger kinds reach a large size. The border should be about 2½ feet deep, and at least a foot of this should be of good rough drainage, and the rest made up of a mixture of two parts fibrous peat to one of sand. This is not always necessary, for in some parts of the country many kinds will do well with the natural soil, but for kinds such as *R. Dalhousiæ*, nothing but peat should be used. All Rhododendrons are surface-rooting, and even in large plants the roots seldom reach more than 1 foot or 15 inches in depth. For this reason, when planting, never cover the surface of the ball with more than half an inch of new soil. A free access of air to the roots is a first essential to success with Rhododendrons. The summer temperature of the house should be kept as low as possible, for the leaves of many kinds are apt to become scalded if the house gets too warm. For this reason roller blinds should be fitted outside and let down in hot weather and drawn up as soon as the sun has left that part of the house. Copious waterings, overhead and at the root, are needed during the spring and summer, with less during the autumn and winter months, or on any sign of ill-health. If in pots, the plants may be removed after finishing growth, to a shady place out of doors, to harden during the summer and autumn. An unglazed house with roller blinds is useful for this purpose, and may be fitted up so as to be useful for many other purposes.

CHAS. P. RAFFILL.

Kew.

WHISPERING PINES.—In a grove of Scotch Firs there is music on almost every day of the year. Through the open spaces between their ruddy pillars deep organ tones reverberate in the tempest and wild notes are struck at each fresh onslaught of the gale. There are whisperings from lonely northern forests, trodden only by the light footfall of the deer, shrill echoes of the eagle's scream and the plover's melancholy wailing, answering each other in the dense solitudes of the blue-green crowns far overhead, whenever the threatenings of storm are borne upon the wings of the wind. And in calm and sunny weather the songs of birds and murmurs of insect life and all the peaceful sounds of Nature, make richer harmonies when heard among the Pines. Harmonies that pass into the warp and woof of remembrance and last as long as life itself.

THE GREATER TREES OF THE NORTHERN FOREST.—No. 23.

THE LARCH (*Larix europœa*).

The best tree that ever came to us from oversea, for its timber; worthy to rank beside our Ash and Oak, and among the best trees for beauty. In plantations, often ill-made and quickly cut down, one seldom sees this extraordinary beauty; but if we cross the Alps and get into some natural Larch forest, with the huge patriarchs barkless and prone among the young trees, or see the trees in a picturesque group beside some rapid Tyrolese river, or on the rocks over a mountain torrent; or as at Dunkeld, where some of the first trees planted in our islands still stand; then we get some idea of its beauty. A native of the cold and lovely mountains of central Europe, it is suited for all parts of our islands, and for many kinds of soil. The Larch is the great tree of the dry, cold regions of the northern hemisphere, where it is found spreading across Europe, Asia, and America. True it bears various names according as its home is in Sikkim, Japan, Siberia, Switzerland, or the Rocky Mountains, but whether called *Larix Griffithii*, *japonica* and *leptolepis*, *sibirica* and *dahurica*, *europœa* or *americana*, *occidentalis* and *Lyalli*—as the American species are now known—its form differs so little that all may be treated under the generic name of Larch. Such distinctions as exist between these kinds hardly touch the general appearance of the tree. Avoiding the rich soils of the plain and the shelter of the lowlands, the Larch seeks regions that are high, and cold, and is happiest upon the wind-swept slopes of the mountain-side. The centre of its distribution appears to be in Siberia, from whence it has made its way east and west into Europe and America, undergoing slight modifications of habit and form with changes of soil and climate.

In Europe the Larch is seen at its best in the central alpine region, though scattered more or less throughout the entire chain and its most precious ornament and possession. It represents at once the building material and fuel of the mountaineer, for the few other trees which share with it the upper slopes are rarer and of slow growth. For regions such as this the wood of the Larch is the most valued of all the Fir tribe, being hard, of rich red colour, full of resin, and so lasting as to have earned the name "Oak of the mountains." The oldest of the Swiss chalets, dating in some cases from the fourteenth century, are built of Larch, and their framework is as sound to-day as ever.

Timber.

It is much used for building chalets, farm-buildings, and all work requiring lightness and great strength; in Russia it is used in preference to Oak in the dockyards, becoming hard as stone in contact with salt water, though its rigidity unfits it for masts or spars. It is also much used for the making of ladders, and its lighter wood for vine-trellises, for which it is in great demand in the south of Europe, and for hop-poles and other outdoor work in the north, because of its resistance to weather. Though it burns well it is not so good for fuel as other mountain trees. From the near presence of vast Larch woods, the honey of Chamounix is supposed to derive its peculiar flavour.

In its own land.

Dr. Christ's account of it in its own country is so graphic, that we quote the following from his book—" Flore de la Suisse."

" Its fine and needle-like leaves, which fall at the approach of winter, enable it to support the extremes of heat and cold better than any other mountain tree. Its rough and deeply scored bark recalls that of the Oak, but is of brighter, ruddier tone, showing reddish-crimson when broken. Lemon-hued *Everma* adorn it with a dainty, moss-like covering, more brilliant than the lichen growth of other trees. While young, the mountain Larch is very erect, and it is only with advancing age that some of its branches assume that densely spreading and curved form which impart to it more of character and beauty. In good conditions of soil it often reaches a great size, for Larches of 80 feet in height and 6 feet in diameter, are by no means rare. The report issued by the Swiss Federal Council on mountain forests mentions one tree in the Vaudois Alps which measured 8 feet in diameter at 9 feet from the ground, and yet was only 250 years old. It is one of our most precious timber trees, the wood being of a deep brown in the older trees, and stoutly resisting the effects of air and water. Sendtner remarks that its texture is as tough and compact as the root-wood of Pine trees, but this is not from the same excessive amount of resin, but is caused by a thickening of the cellular tissues until they are completely filled and pressed together. In the Valais are chalets built of this wood hundreds of years ago, and which, though stained a deep black by age and sunlight, are as sound as when newly put up. The rustling of the wind in the Larch forests is soft and musical, and the young foliage of tender green imparts to them a peculiar grace and charm in early summer. In districts of the Haut Valais—as at Kipperwald—where the Larch mingles with the Birch, the effect is delicate, luminous, almost ethereal.

" The contrast between the forest-clad heights of an alpine landscape, as seen in summer and in winter, is very striking. In summer, the tree in its foliage of finest green, in effect is not very different from the Fir; but in winter, and even in spring, when the snow no longer covers the face of the earth, it gives such a touch of sadness and desolation to the landscape that one can hardly understand the change. The valley, so verdant in summer, now appears bare and forestless, because the branches of the Larch are so slender, and their colour so pale, that the trees are scarcely to be distinguished from the brown soil of the forest. In woods of summer-leafing trees one is prepared for this change, but unconsciously one is apt to endow the foliage of the Coniferæ with continuous life, and thus the eye is surprised at its loss. But the debt is amply repaid with the awakening year, when the forest bursts into exquisite beauty through changing phases such as are unknown among the pine woods. The finely drooping branches are dotted with a thousand ruby-coloured Cones even before the bursting of the leaf, and these again are mingled with Catkins of fairest yellow."

The outline of the Larch is graceful and picturesque. In its youth erect and tapering, with age it often becomes quaintly irregular, the more so if perched upon rocky ledges, or standing in the track of an ancient moraine and exposed to wind. Its trunk and limbs are then twisted into shapes the most fantastic, now standing stiffly defiant as though in mute rebellion against its hard destiny, now drooping in quaint disorder after long battling with the elements. Nothing is more picturesque than one of these storm-beaten veterans, worsted in the long struggle for existence, with many of its branches gone yet standing its ground, shaking its shattered limbs in the face of the blast and still decking itself in green to welcome the returning summer. Many such storm-scarred trees are to be seen in the higher Alps—the valleys of Aoste, of Valais, and the Grisons, and especially upon the southern slope of the Pennine Alps—old trees with their branches torn to shreds and their tops splintered, yet sound and vigorous at heart, disdaining to give up the struggle so long as summer gives time to restore the winter's losses. Seen in bright moonlight, thrown into relief against a clear sky or the snowy glaciers, there is something which charms us in these patriarchal trees, a lesson of quenchless hope with its long-sustained endeavour, of a spirit that never knows when it is beaten. In the depths of the Valais are many fine old trees standing alone in the summer pasture-land and giving shelter year after year to bands of shepherds with their flocks. Upon the Alps of Civiez, in the deep Vallon de Nendaz, and above Iserable, such veterans may be seen, familiar to many generations of the hardy mountaineers, who every summer make their cheese and their butter in the noontide shade of their vast limbs, and sleep in the branches or upon the ground under the same protecting canopy. Trees 100 feet high are not uncommon. The famous Larch of Blitzingen in the Haut Valais, though partly shattered by lightning upon several occasions, still exceeds 90 feet in height, with a girth of 26 feet just above the ground: its age has been estimated at 500 years. Nor is this age at all exceptional, for there are many older trees than this, instanced by the vast trunk cut in the Valais and shown at Geneva in 1896, during the Swiss National Exhibition, its age being over 900 years. The march of the centuries was traced upon this solid disk by little flags stuck in the woody layers corresponding with contemporary great events, from the year 1291, which saw the dawn of the Swiss Federation, to 1315 with its battle of Morgarten, and so on through the national history to the present time. This historical tree is still preserved in the Swiss Federal Museum.

Area.

The Larch covers a vast area among the Alps, touching here and there the Chestnuts of the Mediterranean region where they creep upwards from the plains, as alongside the railway between St Maurice and Martigny (Valais), where the sylva of the north joins hands with that of the south. Further west, and south, it becomes rare and dies away in the Jura, the Vosges, and the Basses Alpes. Its limit of altitude is about 7000 feet, or a little more upon the southern slopes of the Alps. Though often supposed to be impatient of chalk this is not the case, provided the situation be open and well-drained. The finest Larch forests are seen in the Valais, the Grisons, and the Tyrol, but commonly mingled with other trees upon the lower slopes and with the Swiss Pine above, forming woods of beautiful contrast from the great difference in aspect and character of these two great trees of Switzerland. It is less often found alone.

Largest forests.

The largest forests of pure Larch occur in the mountains of Haut Valais in the valleys of Saas and St Nicolas, upon the Simplon, and in the Binnenthal. These valleys are for the most part closed by narrow and damp gorges which are thickly grown with Pine woods; but on mounting to where their sides open out to the air and sunlight, the upper slopes are clothed with forests of pure Larch. Scattered in decreasing numbers in the Alps Vaudoises, the tree reaches its western limit in Dauphiny, where it is scarce and of poor quality. Around Berne also it becomes scanty, and disappears completely from central Switzerland, in the cantons of Glaris and Unterwald. The drier slopes of the Carpathians suit it well but, fearing the heat of the Mediterranean region, it is absent through the whole of southern Europe from Caucasus to the Pyrenees, though by a strange error, Nyman reports it as growing in the Pyrenees and in parts of Catalonia. From the Carpathians, eastward it disappears completely in the plains of Russia, only to reappear on the far side of the Ural Mountains in the form *sibirica*, which differs from that of Europe only in its more upright and tapering trunk, and the more rounded and convex scales of its cones. Northward it reaches its arctic limit in Bogenida—latitude 71°—where, as a stunted shrub it creeps nearer the pole than any other tree.

A long winter's rest of four or five months is best for the Larch, and it must have space and light, hence very close planting is not good, and we should plant it more and more in mixed woods rather than in solid masses. In forests, the Larch is always wide apart, and the soil covered with a rich sward, which is regularly pastured or mown.

Increase. The tree gives seed so freely in its native region, and is increased to such an extent in all the finest nurseries of Europe worthy of the name, that there is not often need to propagate it in a home nursery, unless it be upon the largest estates and on soil fitted for seed-raising, which many soils are not. One of the evils of the home nursery that we usually see, is that everything in it is kept till too old for the best planting; whereas, the smaller the Larch is when planted, the better the result; little plants are naturally cheaper than large ones, though the large ones are not worth having as a gift. As regards the space allowed to each tree, I think 4 feet both ways is the best, whether the trees are planted for their own sake or as nurses to other trees. As nurses they might even be planted a little closer, but, generally, 4 feet is the right distance apart. The Larch fruits early, but the seed is often sterile until middle age when it becomes regularly fertile. The cones open sometimes in the autumn but more often not until the following spring, remaining on the trees for years after shedding their seed. These empty cones are readily known by their dark colour, the new cones being red and grey. The seed is mostly shed in March. As sold by the trade it contains only 35 to 45 per cent. of fertile seed, while the proportion is often less. The way to test it is to put the seed in water, when the fertile seeds sink. This large proportion of bad seed is due to the thick outer husk, which makes good and bad so nearly equal in weight as to hinder separation by mechanical means. Another reason is the smallness of the cones. When fresh, from 60,000 to 100,000 seeds go the pound, according to quality. It germinates in three or four weeks and will keep good for as many years, two to three years being needed to raise useful plants. Where Larch is sown in quantity it is usual to steep the seed in water for a fortnight or so before sowing in the spring; this softens the hard outer husk, and hastens germination.

Larch Disease.—The Larch, like all the trees of Europe, has a great many diseases, but the one that affects us most is that known as "Canker," and the work of a fungus (*Dasycypha calycina*) which has the power not only of living on the outside but also of making its way into the heart of the tree. The first sign of this disease is an unhealthy look about the needles, and their early fall. Spots soon follow upon the twigs and branches, and the pretty cup-like spores of the fungus (called *Peziza*) appear upon resinous wounds or swellings, spreading the disorder as they ripen. The remedy is difficult, not to say impossible, to apply in any thorough way. Not unlikely our mild open winters, which are so different from the arctic winters in which the Larch usually lives, have something to do with it, and also, owing to the great popularity of the tree, the fashion in which it has been planted in masses, very often absurdly close. We have seen it planted 18 inches apart, and so weak that the wind blew the trees over. If the disease occurs in such conditions it spreads rapidly. The remedy is to group the Larch more in open and airy places, and the higher and more exposed the better. If used in our moist valleys it is better to go in for mixed planting instead of massing, although here and there one must mass.

References.—Evelyn, Silva, p. 309; Loudon, Aboretum, vol. 4, p. 2350; Selby, British Forest Trees, p. 483; Veitch's Manual, p. 125; Cobbett, Woodlands, par. 311; Gordon, Pinetum, p. 168; Webster, Hardy Coniferous Trees, p. 65; Mouillefert, Essences Forestieres, p. 350; Cannon, Semer et Planter, pp. 56 and 159; Mathieu, Flore Forestiere, p. 555; Boppe and Jolyet, Les Forets, p. 90: Forbes, English Estate Forestry, p. 87; Michie, The Larch, culture and management; and many notes in *Woods and Forests*.

H. CORREVON.

JACOBINIA (JUSTICIA).

These soft-wooded hothouse plants have suffered much through changes, for all have been known under other names, and several have quite an appalling list of synonyms. The group has been partly torn from Justicia, a large tropical genus now little grown in gardens, and widely scattered over the warmer parts of the world in India, Africa, and South America. A few other plants long known as Libonia, Sericographis, and Sericobonia, are also included with them. As now understood Jacobinia includes some 30 to 40 species of hothouse plants from Mexico and the warmer parts of South America, with tubular flowers of scarlet, orange, yellow, or pink. While in most cases crowded together in dense heads, in some the flowers are arranged as sparse clusters which are more useful for cutting. Though forming shrubs or even low trees of 10 or more feet in their own country, their gaunt straight stems are against the use of old plants in the greenhouse and it is usual to discard them after the second or third season, while some growers prefer to start afresh each spring.

In the main of simple culture, their needs are rich soil, a moist and genial atmosphere while in growth, and rather less heat while hardening and when in flower. Their value lies in the fact that they bloom for the most part during winter, when their bright heads of flower are useful in lighting up the greenhouse or for rooms, lasting for several weeks in beauty. For this work plants in small pots are the best, and these may be raised each spring from young tops rooted in heat and grown on freely till their flowering pots are well filled with roots, when they are kept going by liquid manure. These young plants may be stopped once, or even twice if started early and intended to flower late, but being very long jointed, no amount of pinching will make them bushy and it is best to aim at a few stout shoots and large heads, than to risk loss of flower through weakened growths. Old plants may be cut back after a rest, and do very well in larger pots for a second season, but after this they become naked. If neglected, even young plants soon take an ugly look by the loss of their leaves, which, while handsome in health, are sensitive to drought, sudden changes of temperature, and in some cases to fog and gaslight. Red spider, to which they are subject, has the same effect and must be kept away by vigorous growth in a moist atmosphere, with abundance of water at the root while active. Small plants of *Jacobinia Pohliana* are cleverly grown for the French market by getting large plants to form their cone-like flower-heads early, and then, while still undeveloped, these tops are rooted as cuttings and open their flowers at once, in little pots which find a ready sale for house decoration.

Most of the Jacobinias are old plants, but one kind is new, having come to France only a few years ago, and useful in the open during summer and under glass in autumn. Coming from Uruguay, *Jacobinia suberecta* is less tender than most, with a trailing habit and small white leaves rather like those of the silvery Gnaphalium, and fitted for the same uses. In addition to its pretty foliage it bears bright heads of orange-crimson flowers distinct and beautiful in the autumn, but coming rather late these are not always seen at their best in the open but will finish blooming in the greenhouse. This new kind does not seem to have yet found its way into English gardens, but is offered by French houses, and is a pretty plant.

Jacobinia aurea.—An erect shrub of 4 to 6 feet, with large rounded leaves upon long stalks, and tubular flowers of bright yellow in large crowded heads, borne at the tips of the shoots. Does best in an intermediate house, flowering from July to late autumn, but is now rarely met with. Honduras. Syn. *Cyrtanthera catalpæfolia.*

J. chrysostephana.—Till within the last two or three years this plant had also well-nigh disappeared from gardens, spite of its beauty during the winter months. It is an erect shrub with angular shoots and dark green leaves, shaded with reddish-purple beneath and threaded by red veins. Its bright orange-yellow flowers, of a lighter shade within the curved tube, are carried in dense flat heads and last in beauty for many weeks. It is easily raised from cuttings, and grown in an intermediate house. Mexico. Syn. *Cyrtanthera chrysostephana.*

J. coccinea.—A handsome kind, seen recently at the meetings of the Royal Horticultural Society, sent by Messrs. Veitch, and also well flowered in the conservatory at Kew. In its own country it reaches 8 to 10 feet high and is then very conspicuous with its flowers of deep scarlet in large tapering heads, the hooded tubes set in a cone-like cluster of bright green hairy bracts. The leaves are broadly oval, smooth and shining, of thinner texture and upon slighter stems than in others of the group. Easily raised from cuttings, it is one of the finest of winter-flowering plants, blooming and lasting well in a comparatively cool house. Cayenne. Syns. *Justicia coccinea*, and *Pachystachys coccinea*.

J. Ghiesbreghtiana.—A beautiful greenhouse shrub long known as Sericographis, which will stand rather cooler treatment than others of the group, though some heat is necessary while making growth. Its winter flowers of bright scarlet in a half-drooping feathery raceme of 6 to 8 inches, are useful for cutting or last a long while upon the plant. It may be had in bloom from October to December, or from Christmas to February, and well grown plants from 1 to 3 feet high are useful in the winter months, with their showy flowers overtopping the foliage of deep, glossy green. Young plants in small pots flower freely, potted in rich soil and fed with manure on coming into flower. Stopping should be done early and the plants grown on in full light and a moist atmosphere, with a partial rest to ripen and develop flower from the end of July. Late potting, or shade, means failure. Young cuttings may be potted 5 or 6 together, and older plants grown singly. Sudden changes of temperature, or drought, should be avoided, as tending to cause the flowers to fall. Old plants may be kept for several seasons, for conservatory decoration. Mexico. Syns. *Sericographis*, or *Aphelandra Ghiesbreghtiana*.

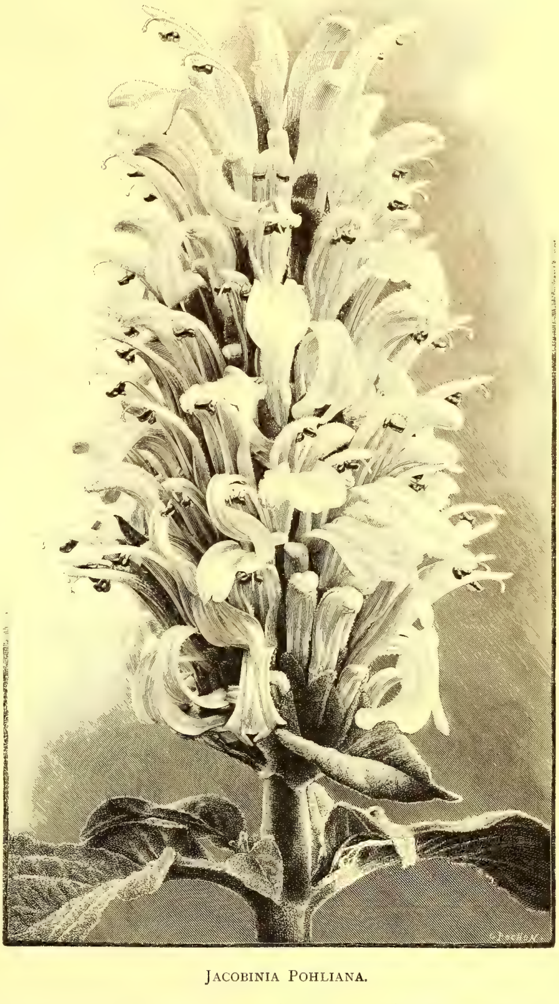
J. liboniana.—A straggling Brazilian shrub of 5 to 6 feet, with bold smooth leaves of deep green, nearly or quite 12 inches long and about half this in width, shaded with purple underneath, the same colour suffusing the stems, leaf-stalks, and veins. The flowers are in large crown-like heads of soft red, with the curved florets set in purple-tinted bracts. It is a handsome plant, beautiful when loaded with flowers in autumn or early spring. Where room can be spared, it succeeds very well planted out in a warm house or winter garden.

J. Lindeni.—A handsome Mexican shrub with angular greenish-brown stems, swollen at the joints, and long oval leaves of smooth texture, glossy above and shaded violet beneath, threaded with conspicuous reddish-brown veins. Tubular flowers of 2 inches long, of deep orange-yellow colour, coming in showy heads during autumn.

J. magnifica.—A good old plant and one of the best known; useful for its long display and for the ease with which it flowers at different seasons from summer to mid-winter. At Rio-de-Janeiro, whence it was brought in 1827, it makes a shrub 10 feet high with stout angular branches and noble leaves of downy texture, a foot long. The flowers are rosy-purple, gathered in a dense spike of tubular florets set in a cone-like head of purplish bracts. The florets are cut into two lobes, the upper lip arching, and the lower recurved. This kind will stand rougher treatment and a cooler temperature than most, but is worthy of care for its usefulness in rooms and the conservatory, the flowers coming in long succession though individually short-lived. In warm southern gardens it is sometimes stood out for awhile in summer, but unless well-sheltered the leaves suffer, with loss of effect. It is best under glass, where a long season of beauty may be secured by growing young plants, and old ones cut back, in houses of varying temperature. Old plants need a rest before cutting back and should then be started vigorously in heat, and repotted into rather small pots when growth has well begun; fed with soot-water and liquid manure, these will bloom freely in a winter temperature of 50 to 60 degrees. A variety is sometimes offered as *Justicia carnea*, with flowers of a paler shade. Much grown forty years ago, this kind has now largely given place to the dwarfer forms of *Justicia Pohliana*.

J. Mohintli.—A beautiful old plant, but rare in gardens and of poor appearance unless well grown. Of vigorous growth, it makes a spreading bush of 10 feet in the warmer parts of Mexico, specially abundant in the valley of Orizaba and around Cordova, where its many heads of orange-scarlet flowers are beautiful from January to May. Its stems are round, slightly swollen at the joints, with narrow oval leaves of thick texture and hard glossy surface, drawn out to a blunt point. It is only sub-evergreen, and if neglected becomes drawn and naked. To avoid this it should be freely pinched and well fed and is then a handsome greenhouse shrub, flowering profusely in spring and early summer. The flowers appear upon the side-shoots and in the leaf-axils, the long orange-red tubes swollen in the centre and deeply two-lobed, the upper lobe erect and narrow, the lower curled in a spiral and notched. Easily raised from cuttings of the soft side shoots. Syns. *Dicliptera scorpioides*, *Drejera Willdenowiana*, *Sericographis Mohintli.*

J. pauciflora.—An old greenhouse plant better known as *Libonia floribunda*, now less grown than formerly. It is a pretty little shrub of 1 to 3 feet, neat in habit, and leafy as a dwarf Box. The yellow and red flowers are very welcome in autumn and winter, opening from October to January or even later according to treatment, and long enduring. It requires careful handling, the leaves being sensitive to drought, changes of temperature, fog, and gaslight, and the plants never quite recover their loss. Some growers plant out the newly-rooted cuttings in prepared beds under frames, where air or warmth can be given at will, and the lights removed for awhile during August and part of September, when the plants are potted and flowered in gentle heat. Others grow them in pots in a cold frame during summer, allowing air and less water towards autumn, for the ripening which alone induces a good show of flower. This plan has its advantages but the pots should be plunged to the rim, constant moisture being needed while in growth, and syringing to avoid red spider. Weak liquid manure and soot-water are used to stimulate free growth in small pots. Cuttings may be made in spring, or for larger plants may be taken in summer and repotted early in the year. Well grown old plants are handsome for conservatory decoration. In the south of Europe this is a favourite shrub, often a yard or more high, always neat, and beautiful when in flower. Brazil.



Jacobinia Pohliana.

J. Penrhosiensis.—This plant is a cross between *pauciflora* and *Ghiesbreghtiana* and shows a blending of their good qualities. It is more reliable and earlier in flower than *pauciflora*, and free from its tendency to loss of leaf. Its habit is more drooping, with larger leaves and deeper red flowers, appearing from October and lasting long in a greenhouse temperature. Its flowers are larger, more abundant, and useful for cutting, the sprays showing well in artificial light. As it needs a long season of growth, the cuttings are best made in summer and repotted in early spring for flowering the following autumn. Perhaps still best known by its old name, *Libonia Penrhosiensis.*

A second hybrid between *J. Ghiesbreghtiana* and *J. pauciflora*, but raised in another garden and quite different from *Libonia Penrhosiensis*, is known as × *Sericobonia ignea.* It is a pretty little greenhouse shrub of 2 to 3 feet, with slender, erect stems, swollen and reddish at the joints, and long leaves of deep glossy green. The clusters of brilliant orange-red flowers spring from the leaf-axils, opening in November and December, and lasting several weeks in full beauty. Being freely produced, their colour is good for rooms in the dull season, and the long light stems are pretty for cutting. It has never been a common plant, but is well worth growing.

J. Pohliana.—A very handsome plant, sometimes classed as a variety of *Justicia magnifica*, but distinct in its more robust and leafy habit and in the intense colour of its flowers. Its beauty may be gathered from our engraving, showing the fine flower-spike carried upon angular stems of 2 to 3 feet, with handsome leaves of 6 inches, often prettily tinged with purple. It flowers freely in autumn and winter and is one of the most useful and easily grown of the group. A variety known as *velutina* carries soft downy leaves and flowers of a pretty pale rose ; while *velutina nana* is a dwarf form with all the merits of its parent, and much grown in small pots for decoration.

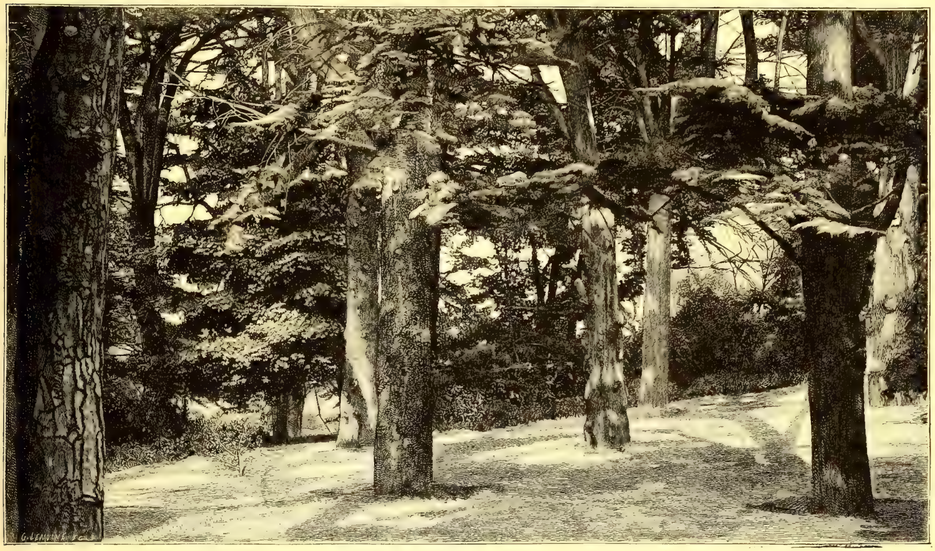
J. sericea.—A distinct and beautiful plant from Peru, covered with silky white hairs and bearing spikes of hairy red flowers. Introduced early in the last century, it is perhaps not now in cultivation.

J. suberecta.—A new species lately raised in France from seed brought from Uruguay by M. André. It is a greenhouse perennial herb, with trailing stems rising to flower, and covered with a white silky coating of fine appearance. The leaves are rounded, thick, upon very short stalks, and covered with the same pale hairs. The flower-stems rise abruptly, bearing narrow tubular flowers of pale orange-red, nearly closed at the mouth by dark anthers, and gathered into clusters of 12 to 15 blooms. These showy flowers are in fine contrast with the spreading carpet of pale stems and foliage, and the plant is sufficiently hardy for use in the open during summer in the same way as for *Gnaphalium lanatum*, which it somewhat resembles. As the flowers appear somewhat late, it is a gain to grow it in pots, for removal to the greenhouse on the approach of bad weather. B.

THE KENTUCKY YELLOW-WOOD.

We have received several letters as to existing trees of this kind, and they prove that the fine old trees to be seen here and there, sometimes quite as large as in Kentucky, are fast dying out. Of the group at Highclere Castle only one now remains, and that tree fast going. The fine tree at Syon House is still the largest in England, with a height of 75 feet, a trunk measurement of 6½ feet, and a spread of 60 feet. But it is also in decay, and become so hollow in the centre as to need support. At Kew, only one of the trees existing twenty years ago is now alive, standing by itself, near the Director's office. It is in fair health, and though only about 30 feet high has a girth of more than 5 feet and a spread of 40 feet. The tree with the largest stem is at Surrenden Park in Kent, where a tree 50 feet high measures 8½ feet round the trunk ; of late years it has suffered much from storms, one of which carried away its head, though it is still beautiful in autumn and flowered a little this year. Of a tree at Knap Hill Nursery Mr. Waterer sends an interesting note. This old tree is 40 feet high and about the same in spread of limb, while the trunk measures 8 feet at 3 feet from the ground. Mr. Waterer adds that it is always fine in the autumn, and especially so this year. It has flowered at intervals, but only in irregular patches and upon the weaker side-shoots.

The more vigorous and healthy branches near the top do not flower, and strange to say, the easterly side of the tree flowers more freely than any other. This all tends to prove that the Cladrastis is not a long-lived tree, and lest we should lose the effect of its fine autumn colour, planters should make a note of it wherever the conditions of soil and shelter permit, and seek to renew these dying veterans.



Part of a Group of Cedars of Lebanon, at Whitton. *Engraved for "Flora," from a Photo.*

CEDARS OF LEBANON AT WHITTON.

To demonstrate the value of grouping trees of the nobler sorts like the Cedar of Lebanon, we have the pleasure to show this month a view of grouped Cedars of which the effect is very good, although an even closer planting might have given taller stems. The impression obtained from grouping such trees is far more effective than the usual way of isolated specimens. Our account of the Cedar of Lebanon appeared in the issue for October last, upon p. 291.

Pinus Excelsa and the Weymouth Pine.—This Pine is, in my opinion, one of the finest Conifers we have, for wherever I plant it—including even Scotland and Ireland—it never fails in any exposure, bleak or sheltered, and in all soils. I find it grows quickest on light, sandy soils, and if the site is exposed the timber is best. In sheltered places it rushes up quickly, but the wood is soft from the large size of the annual rings. Its delicate bluish tone and spreading growth make it very effective when grouped, either with a number of its kind or with other Pines. I rank it as one of the best kinds among the Pines, as I do *Abies lasiocarpa* among the Spruces. I have long struck the Weymouth Pine, its relative, out of my lists, as being a dangerous tree to plant anywhere in the neighbourhood of Beeches, as it is the one tree that breeds the insect which attacks the Beech, causing what is known as the "Beech-blight." In numberless instances I have been asked to advise upon this Beech disease, and have invariably found the Weymouth Pine to be the contaminating source. I have just had an instance of this at Bear Wood, where the fine Beeches were being killed, this being due to half a dozen infected Weymouths. Though this Pine is nearly related to *Pinus excelsa* I have never seen a *Pinus excelsa* attacked by the insect. *Pinus excelsa* has no disease in this country, or at least I have never detected any. W. G.

MARICA.*

THIS group of the Iris family comprises eleven or twelve beautiful plants, rarely seen, save in a few choice collections. Those in cultivation are handsome plants with Iris-like foliage of graceful effect under glass, growing and flowering freely. The flowers are exquisitely beautiful, poised like butterflies upon long leaf-like stems, delicate in texture as any Orchid, and though each bloom only lasts for a few hours, they come in succession for two or three weeks during the summer. The plants are found mainly in eastern tropical America, from Mexico to South Brazil. One kind—*Marica Sabini*—is African, coming from the island of St. Thomas, and bearing pale blue or mauve flowers, fully 3 inches across. *Marica brachypus* is a native of Trinidad, whilst *Marica gracilis* comes from the cooler parts of Mexico and Central America.

CULTURE.—With one exception, they are evergreen stove perennials, not drying off like many hothouse plants, though a partial rest should follow the flowering season. The dark glossy leaves require moisture at all times, and an increased supply during the growing period, when doses of weak liquid manure may be given. The plants thrive in good loam, with some fibrous peat, and plenty of sharp washed sand. There should also be ample drainage to carry off the surplus water in the spring months, when the flower-stalks are developing and much moisture is required. The best time to repot is early spring, the care needed, being, to withhold water for a few days afterwards until new roots form. Otherwise the stems are apt to decay just at the ground line, with loss of flower and sometimes of the plant itself. Once past this stage, water may be given freely. Increase is simple with any old plant of *Marica gracilis*, for after flowering, the tips of the flower-stalks can be layered into small pots, where they root and form sturdy little plants. Other kinds should be divided and potted off in small pots; put into brisk bottom-heat and shaded from sun for a few days, new roots quickly form, and the young plants should be grown on into large tufts, for small plants are of little value for effect while large tufts will give beauty for several weeks. The plant of our plate is a pretty one, when seen at its best in the variety *splendens*, but like most of the group it is to-day rare in gardens. The following kinds have been in cultivation :—

Marica brachypus.—A beautiful plant, like that of our plate in form of flower, but yellow in colour and with foliage not quite so stout. The flowers are in small stemless clusters, with limp and ovate spathe-valves as against the lanceolate and firm spathe-valves in some other kinds, and the segments bright yellow striped with red and brown towards the base. West Indies. Syn. *Cypella brachypus*.

M. cærulea.—This is perhaps the best known of the group, having been in cultivation for many years. It differs principally from the plant figured in the colour of its flowers, which are bright blue in some forms and of a distinct lilac shade in others. It has

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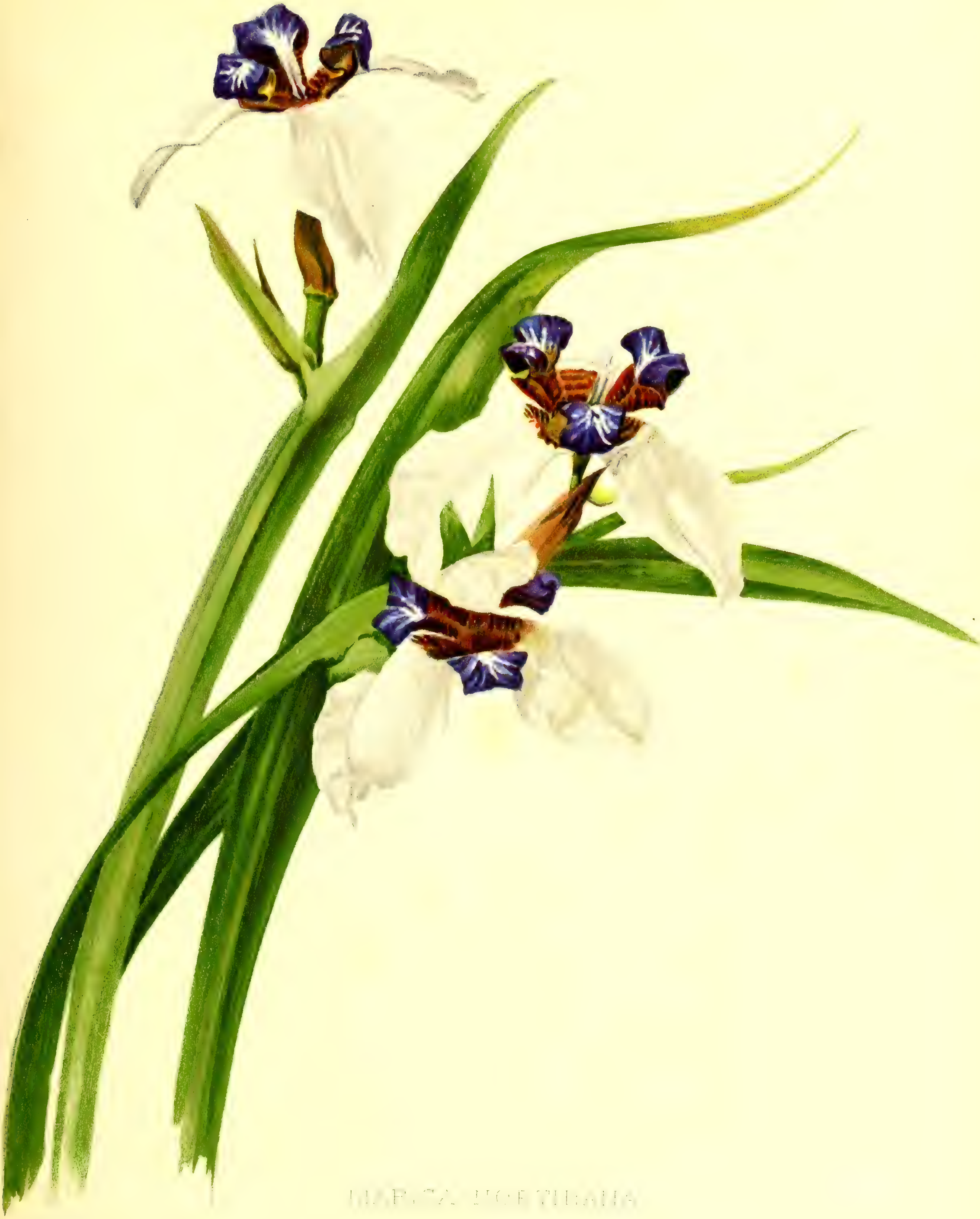
* With coloured plate from a drawing by H. G. Moon in The Nurseries, St Albans.



MARICA NORTHIANA

been several times figured and described under this and other names, such as *Cypella cærulea* and *Cypura cærulea.*

M. gracilis.—A plant of more slender habit than other kinds and so much hardier from its more northerly range as to succeed in a greenhouse temperature, where I have grown it with Moræas, *Iris fimbriata*, and Aristea, with perfect success. The flowers are on leaf-like flower-stalks which lengthen to produce offsets. They are from 1½ to 2 inches wide, the outer segments being white with cross-bars of brown and yellow at the base, the inner segments reflexed, and blue, like a very small flower of *Marica Northiana.* Syn. *Cypella gracilis.*

M. humilis.—A Brazilian species probably long lost to cultivation though flowered by Loddiges in 1825. It comes very near *M. lutea*, differing from it mainly in its forked flower-stem and the blue-tipped inner segments.

M. longifolia.—Another yellow-flowered species from Rio de Janeiro, which has also disappeared from gardens. It must have been an attractive plant, as the flowers were golden yellow, 2 inches across, with the inner segments banded with brown. It was grown in the Berlin Botanic Gardens about 1828, and, like many other kinds of Marica was originally placed in the genus *Cypella.*

M. lutea.—A dwarf and early-flowering plant, with narrow erect leaves little more than 6 inches high, and blooming in April. Its flowers are yellow and like those of *M. humilis* but of somewhat brighter tone, with five reddish bars upon the outer segments in place of four, and the ends of the inner segments white with green bars instead of plain purple or blue.

M. Northiana.—One of the finest of the group, with flat sword-shaped leaves 1 to 2 feet in length and 2 inches wide. The flower-stalk is yet longer and flattened in the same way, with fragrant flowers borne near the end, and 3 to 4 inches across when fully expanded. The beautiful blend of colours seen in the flowers is faithfully rendered in the plate, the variety *splendens* being distinguished from its parent only in its intensity of colour. It is not a new plant, having been known for more than a century past, though so scarce as to have almost disappeared. Syns. *Iris Northiana*, *Ferraria elegans*, and *Moræa Northiana.*

M. occidentalis.—A plant more recently discovered than others of the group, and coming from a region in Peru more to the west of the continent. Its leaves grow in a fan-shaped cluster of about a foot, with erect and winged flower-stems exceeding the leaves. The flowers appear during July in clusters of three, with outer segments white and spreading, the inner mottled with brown and tipped with violet.

Stanmore. JOHN W. ODELL.

NATURAL ALPINE GARDENS.

A MOVEMENT, which should have some influence on this branch of flower gardening, has lately taken place abroad, in the formation of alpine gardens in their natural homes, at the elevations and among the rocks where they are happiest. We have seen some of these gardens, and while in sympathy with the movement, we regret that instead of taking Nature as it is, and massing the mountain plants upon the ground as they ought to be, they are formed more upon our garden ideas of "rockeries." Surely the right way is to accept the rocks as they are, and plant the ground in natural ways. Not only in Switzerland and other parts of Europe might this be done, but there are many districts in northern England, Wales, Ireland, and Scotland, in which work of the same kind might be undertaken. Even the south in some districts has natural rock cropping out where fine planting might be done in private places too. As to what has been already accomplished in various parts of Europe, we have the following from M. Correvon :—

The Jardin de la Linnæa at Bourg St. Pierre, Valais, is the oldest alpine garden in Switzerland. It was founded in 1889, in response to a generous gift by Prof. Romanes of Oxford, followed by grants from the English and Swiss Alpine Clubs, from Prince de Joinville, and the Swiss Government. The Government continues its support, aided by Prince Ferdinand of Bulgaria, the Geneva lodge of the Swiss Alpine Club, and other contributions. Situated upon a rocky summit overlooking the village of Bourg St. Pierre, its flanks are clothed with thick Larch woods, while four broad tracks and three narrower ones render every part easy of access and lead gently to the summit. Water is laid on from the cascade of Valmay, at twenty minutes' walk from the village, and upon a little platform overlooking the garden and commanding fine views of the surrounding country, a little botanical laboratory has been built for the convenience of visitors; this is already furnished with a good microscope and lenses, and a few books upon alpine plants. A number of rocky beds have been thrown up in different aspects for collections gathered from every quarter of the globe, including the mountains of Jura, the Carpathians, the Pyrenees, Caucasus, and the Himalayas; and other groups are arranged by families. There is also a small arboretum, with fine specimens of the Swiss Pine (*P. cembra*), and upon the open summit a series of plant-borders exposed to wind and sun, where the plants grow to perfection, such little gems as *Eritrichium nanum* spreading in full luxuriance. Owing to its being difficult of access, and to the lack of accommodation in the village, the visitors' book shows only 250 to 300 visits in the season; but these are amply repaid for their trouble by the beauty of the spot and the interest of the collection, which, as an alpine garden, has proved a complete success.

A second botanical garden was founded in 1890 at a height of nearly 4,000 feet, at Pont de Nant in the Alps of Bex, Canton de Vaud; here Dr. Witzceck has a laboratory in connection with the *Faculté des Sciences* of Lausanne. Between 1892 and 1899 Prof. Lachmann of Grenoble opened three alpine gardens in the Alps of Dauphine, all of them in relation to the University of Grenoble. One of these, at Champrousse (5,600 feet), is in a spot so difficult of approach that, in spite of the loss involved, it has in great measure been abandoned. That of Lautaret, though at a height of 6,000 feet, is so easily reached from Grenoble that the students are able to make free use of it during the summer. The third is at Villard-d'Arene (5,800 feet), and is mainly experimental, and for the first care of exotics unable at the outset to stand the rigours of Lautaret.

In 1895 the north-eastern section of the French Alpine Club established quarters in the Vosges, 3,500 feet above the sea, an example followed more recently by the University of Nancy in a similar garden in the Haute-Vosges. The work of Prof. Flahault of Montpellier deserves the highest praise, in the establishment upon Mont Aigoual in the Cevennes, of several stations up to 4,700 feet, where valuable experiments are in progress relating to the growth of mountain Pines and their renewal in denuded areas, and to aid the peasantry by introducing better kinds of grain, fruit, and garden produce than those now grown in the mountains. In a large bog-garden, collections of marsh and water plants are already established, with many alpine plants, native and introduced, now quite at home upon the rocky slopes. This garden cannot fail to be of great service, not only to the students of Montpellier, but to all interested in such matters.

Roused to action by this increasing interest, in July 1900 the German and Austrian Alpine Clubs met at Strasbourg to discuss the culture and protection of mountain plants; and as a result, a society was formed which has already opened alpine gardens in connection with the universities of Munich and Vienna. These are at Schachan (5,400 feet) in the Bavarian Alps, which reported 2,000 visitors in 1903; and upon Gschustzthal in the Brenner Alps (Tyrol), two stations at 3,600 and nearly 7,000 feet respectively. A third garden is at Raxalpa (5,350 feet) in Styria, and the fourth at Neurent in Bavaria (3,600 feet); these are too new to call for more than passing reference, but are of interest as showing how this movement has gained ground.

Italy has had its share of alpine gardens, but many have been abandoned, and the only one in full activity is that opened in memory of the botanist Rostan, in the valley of Piedmont, at a height of about 4,000 feet, and near Mount Viso in the Cottienne Alps. This garden, known as the Rostania, was opened in 1900 in a charming and fertile spot, and is mainly devoted to the alpine plants of Italy and Piedmont. Another garden has lately been opened by Dr. F. Cavara, professor of botany at the University of Catania, in the Valle del Bove upon Mount Etna, and should it prosper, this should meet the wants of southern Italy.

In conclusion, I refer at greater length to the garden of Rambertia upon the Rochers de Naye, visited by the congress held for the furtherance of natural alpine gardening during the summer of last year. The garden is of large extent (14 or 15 acres), and placed astride a spur of the mountain at a height of more than 6,000 feet, with a superb outlook over a wonderful stretch of snowy alpine peaks. About thirty "*rockeries*" of various sizes are scattered along a path which from the summit winds for some 500 feet down, into the valley of Plan d'Arene. While extremely picturesque, the garden has one serious drawback in its lack of water, which—failing that gathered from the melting snow—has to be brought to the mountain top by rail, and then carried for a considerable distance. The northern slope suffers little from this scarcity, but in its southern aspect, which is best suited to the bulk of the plants, they are almost constantly exposed to drought. The Rambertia is the most elevated of all the alpine gardens of Europe, and within it are grown such plants of the upper mountain regions as have any chance of enduring so rude a climate with its long winter; they already represent every quarter and almost every mountain region of the globe. Some kinds thrive wonderfully well, such as the Mountain Poppies (*Papaver nudicaule* and *alpinum*) which have spread everywhere, giving birth to endless natural hybrids of the daintiest forms and colours. These, especially in varieties of *P. alpinum*, have even broken the bounds of the garden, and may be found in all directions—on the railway banks and cuttings, in crevices of the rock, and the beaten tracks leading to the summit, and even upon the tiled roof of the hotel itself. Alpine Sea Holly (*Eryngium alpinum*) grows in spreading masses of great beauty, here and there, in different spots and aspects, with a rich succession of colour. Here and there, also, the Edelweiss lies in a thick white carpet, or is scattered in broad flakes, whilst *Eritrichium nanum* and many Androsaces of the high peaks are at home. Even a few exotic plants have made themselves happy in this alpine fastness, such things as *Viola cornuta*, *Campanula pulla*, *Dianthus neglectus*, and *Geranium cinereum*. Such is a rapid review of the more important of the alpine botanical gardens of Europe.

The visit of the congress to the garden at Rambertia was closed by a conference of delegates in furtherance of the aims of the congress, and the passing of the following resolutions:—(1) That friendly relations be maintained with other alpine gardens, including, where possible, the exchange of seed lists; and (2) that a formal report of the proceedings be published with a view to the holding of future gatherings, and as tending to popularise the cultivation of alpine plants under natural conditions.

HENRY CORREVON.

SONGS OF THE WOODS AND FLOWERS: The Sage and the Three Young Men.

Un octogénaire plantoit.
Passe encor de bâtir; mais planter à cet âge.
Disoient trois jouvenceaux, enfants du voisinage
Assurément il radotoit.
Car, au nom des dieux, je vous prie,
Quel fruit de ce labeur pouvez-vous recueillir?
Autant qu'un patriarche il vous faudroit vieillir.
A quoi bon charger votre vie
Des soins d'un avenir qui n'est pas fait pour vous?
Ne songez désormais qu'à vos erreurs passées.
Quittez le long espoir et les vastes pensées;
Tout cela ne convient qu'à nous.
Il ne convient pas à vous-mêmes,
Repartit le vieillard. Tout établissement
Vient tard et dure peu. La main des Parques blêmes
De vos jours et des miens se joue également.
Nos termes sont pareils par leur courte durée.
Qui de nous des clartés de la voûte azurée
Doit jouir le dernier? Est-il aucun moment
Qui vous puisse assurer d'un second seulement?
Mes arriere-neveux me devront cet ombrage:
Hé bien! défendez-vous au sage
De se donner des soins pour le plaisir d'autrui?
Cela même est un fruit que je goûte aujourd'hui:
J'en puis jouir demain, et quelques jours encore;
Je puis enfin compter l'aurore
Plus d'une fois sur vos tombeaux.
Le vieillard eut raison: l'un des trois jouvenceaux
Se noya dès le port, allant à l'Amérique;
L'autre, afin de monter aux grandes dignités,
Dans les emplois de Mars servant la république,
Par un coup imprévu vit ses jours emportés;
Le troisième tomba d'un arbre
Que lui-même il voulut enter:
Et pleurés du vieillard, il grava sur leur marbre
Ce que je viens de raconter.

COBBETT'S TRANSLATION:—A man of four-score was planting trees. "To build might pass; but, to plant at such an age," exclaimed three young men of the neighbourhood. "Surely," said they, "you are doting; for, in God's name, what reward can you receive for this, unless you were to live as long as one of the Patriarchs? What good can there be in loading your life with cares about a time which you are never destined to see? Pray devote the rest of your days to thoughts of your past errors; give up distant and grand expectations; these become only young men, such as we." "They become not even you," answered the old man. "All we do comes late, and is quickly gone. The pale hand of fate sports equally with your days and mine. The shortness of our lives puts us all on a level. Who can say which of us shall last behold the light of heaven? Can any moment of your lives secure you even a second moment? My great grand-children will owe shady groves to me: and, do not blame me for providing delights for others! Why, the thought of this is, of itself, a reward which I already enjoy; I may enjoy it to-morrow, and for some days after that; nay, I may more than once even see the sun rise on your graves." The old man was right; one of the three, ambitious to see the New World, was drowned in the port; another, pursuing fame in the service of Mars, was suddenly stopped by an unexpected shot; the third fell from a tree, on which he himself was putting a graff: and the old man, lamenting their sad end, engraved on their tomb the story here related.

FLORA
AND SYLVA.

Vol. III. No. 24.] MARCH, 1905 [Monthly.

THE BEST FRUITS ONLY.

Judging by the lists published, few people pay any attention to the flavour of our hardy fruits, although there is a vast difference in value between good and bad. Messrs. Ellwanger and Barry, of Rochester, N.Y., have kindly sent us some Apples, the "pick of the basket" in that country, mostly beautiful in colour and excellent in flavour. The best perhaps is *Jonathan*, rather a small red Apple, the favourite with the head of the firm, and difficult to surpass in crispness and peach-like delicacy of flavour. It lasts from November to March, and is one of the best varieties for the table or market. *Hubbardston Nonsuch* is a fine-flavoured, free-growing, and good-bearing Apple. *Esopus Spitzenburg* is a deep red Apple with a fine, crisp, delicious flesh, and one of the best Apples in the Rochester district. Lastly, *Northern Spy*, which comes to our markets occasionally as an Apple of high quality, with the added virtue of being an excellent keeper and a heavy cropper. Whether or not we can grow such Apples in our country, the lesson for us is to keep only to our own best fruits, because Apples of this high quality are sure to be grown more and more, and brought to our markets. Thus, quality will rule the trade, and to anticipate this, we should grow only Apples of the first quality and in kinds that will take the orchard tree shape, as well as smaller forms. However well the small trees on dwarf stocks may do for certain times and places, a well-grown orchard tree, freely thinned and well chosen, is the thing to depend upon.

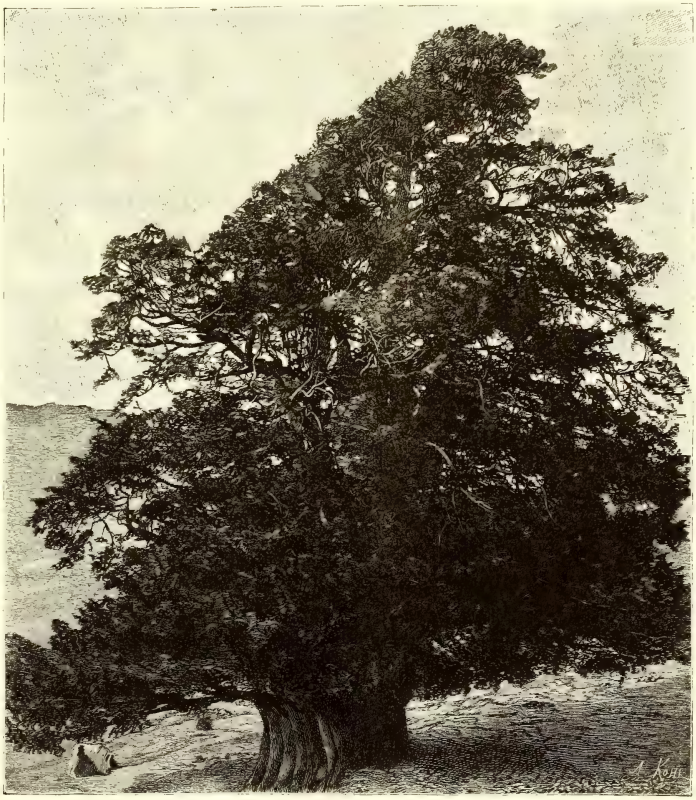
Apples. The best English Apple is the *Blenheim*, in spite of all "election" results, because it is a fine orchard tree and a good eating fruit, as well as one of the best of cooking Apples without sugar. The *Ribstone Pippin* is, I think, better than *Cox's*, but the trees must be kept free from bug and canker, which can now be done by a winter dressing of Bordeaux mixture. It is so often grown in espalier and other distorted forms, that it rarely gets a good chance. There never was an Apple that had so much advertisement as *Cox's Pippin*, and yet, in spite of the enormous numbers of trees planted, one can hardly ever buy a bushel of it in the market. It comes in such small quantity and often of poor quality, although it does well in certain soils.

The *Sturmer Pippin* is a first-rate late Apple of fine quality. The *Sussex Forge* is an excellent Apple, pretty in colour, and good in flavour for autumn use. *Kentish Fillbasket* is one of the best of all regular bearers, and of good flavour. *Warner's King* is a fine Apple and a fine tree. *D'Arcy Spice* is perhaps the most delicate in flavour of all cooking Apples, finding its own sugar; but it is difficult to get clean trees of it. It is however such a good Apple that it ought to be tried on various stocks, on the Crab as well as the Paradise, and also, if possible, on its own roots and on that strong French stock, the *Noir de Vitry*. *French Crab* has fine qualities for cooking and is a long keeper, but is much neglected in our gardens though far better than some of the conventional Apples of the lists. The colonial growers, noticing its fine quality, are sending it to our markets. *Bramley's Seedling* is a good bearer and a fine Apple. *Wellington* we must have for its fine acid quality. *Hawthornden*, *Yorkshire Greening*, and *Reinette Grise*, are worth a place where they can be grown. The west-country Apple, *Tom Putt*, is a good and handsome fruit. The *Keswick Codling* should be grown for its early quality. *Prince Albert* is a capital Apple for gardens, but does not make a fine standard. Among the more tender Apples which have no claims as orchard trees, there are some of good flavour which may be grown in gardens, *e.g.*, *Calville Blanc*, so much used by French cooks and a very expensive Apple on the markets; this I find to be easily grown against walls, in the southern part of the country. I have had good crops of it from trees only two years planted. It is well to get trained trees at first, in order to save time. Other Apples of fine quality are the *Melon*, and the *Mother*, two well-flavoured kinds which need choice garden treatment.

Pears.

With the Pears a careful choice of kinds is even more important than with Apples. Those who know and avoid ill-flavoured varieties can always find Apples of the finest quality in our markets, imported from other countries; but with Pears this is not the case. There is also the danger of growing kinds that will not develop their true character in our climate, such as *Doyenné d'Hiver* and *Duchesse d'Angoulême*, as well as the Pears wrongly classed as good in every catalogue, even of the best houses. The best Pears for Britain, all kinds of high quality, are the following:—*Clapp's Favourite*, *Louise Bonne*, *Doyenné du Comice*, *Marie Louise*, *Nouveau Poiteau*, *Joséphine de Malines*, *Beurré Superfin*, *Thompson*, *Urbaniste*, *Beurre Hardy*, *Winter Nelis*, *Olivier de Serres*, *Passe-Crassane*, and *Soldat laboureur*. Excepting *Doyenné du Comice* we should trust all these as orchard trees, and even *Doyenné du Comice* we have seen do well as an orchard tree in the south. Nearly all can grow in our country as standards on the Pear stock, and the Pear that will not stand this test is not much good for us. Because in large areas of dry and chalky soils the Quince is often a failure, and some kinds will not grow well on the Quince in any soil. Therefore let us grow such kinds as offer us the chance of growing that beautiful thing—a standard Pear tree. Well chosen, well grown, and well looked after and thinned, any one of these is worth a dozen of the doubtful or inferior kinds that are grown, and even figure in the prize dishes at shows.

The following Pears I have seldom found good in quality, and some of them fail altogether:—Beurré d'Amanlis, Beurré Bosc, Beurré Clairgeau, Beurré Diel, Beurré Rance, Chaumontel, Conseiller de la Cour, Durondeau, Fertility, Général Totleben, Knight's Monarch, Pitmaston Duchess, Souvenir du Congrès, Vicar of Winkfield, Belle des Abrès, Bellissime d'Hiver, Gratioli, Hacon's Incomparable, and Passe-Colmar. Not only would it be well not to plant any of these, but it would be a distinct gain to root them up where they are already growing, and plant a greater number of the kinds that are of high quality and attain their true character in our country. W.



Old Yew in Yewdale, Coniston.

THE GREATER TREES OF THE NORTHERN FOREST.—No. 24.

THE YEW (*Taxus baccata*).

I have been reading the poets in a collection of many verses about the Yew; and a sorry story they make of it to anybody who does not know the tree apart from the graveyard. "Sombre," "funereal," and all the dismal epithets they can find, are tacked on to it one after another, by writers like so many sheep, following through a gap. Quite wrongly they judge of it only by one of its uses, and take no note of its natural beauty upon our hills. A poet is supposed to recognise beauty wherever it be found, yet their eyes seem shut to the charm of the Yew; it is none the less our finest native evergreen tree, and, like fresh air and spring water, among the good things that are neglected. We see people making hedges of it, and stuffing it away in shrubberies, and all the while taking immense pains to grow Californian Pines that will never do any good in our country. We never see them taking the trouble to grow the Yew as it should be grown. The warm green of its foliage during winter in some soils is a distinct charm, and there is the fine colour of the stem of an old Yew tree. Often planted in hedges, and allowed to take the tree form, it is too crowded to show this. The toss and sway of the branches in a high wind, is one of the most beautiful effects we know among evergreen trees. But we cannot see these things where the trees are distorted by crowding and clipping, or where it is mutilated at the roots as in graveyards, though it is remarkable what fine character the tree shows even under these trials. Gardeners and planters are not kind to the Yew, and to see it in its finest state we must go to the hills of Surrey, Sussex, and Kent, its most picturesque home being in that grand "cup" of the Sussex Downs, near Chichester. In such free conditions we see the Cedar-like beauty of the tree and also its fine stem colour. Every tree-lover should see the Yew at its best, and then the dismal wail of the poets would count no more. And it will be noted that one of the good points of the tree is its thriving on chalk-hills—to which so many trees are averse—so helping us to add evergreen trees of high value to the dreary and barren downs and wastes that cover so large an area in the southern counties.

Area.

The area of the Yew covers the greater part of Europe, from Portugal and Spain to the Caucasus, and from Scotland to the Mediterranean. In western Europe it prefers the mountainous regions, rising to 487 feet in the Pyrenees, and though sometimes met with in the plains, steep places and cool hills seem to suit it best. I have seen it among the Cedars in North Africa, growing on the cool mountain tops, far above the scorching plains and barren hills of Algeria. It is also found in other warm countries, such as India, where the ground rises high enough for it to find cool conditions. In the cool climate of our green island, it is as happy on the plains as upon the hills, though left to itself it always shows a preference for rising ground.

Recent evidence seems to show that the Yew is fast disappearing in Europe, from regions in which it was once common. Prof. Conventz of Dantzig who has made a special study of it, shows that it formerly abounded in Scandinavia and the north of Germany, but of recent years has disappeared so fast before the spread of civilisation as to have practically ceased to exist in large tracts of country, and is threatened with extinction as a wild tree. He adds "Increasing cultivation of the soil has completely changed and in a great measure ruined the natural aspect of countries by destroying the forest growth of previous ages." None the less, I doubt the conclusion he draws as to its being a disappearing tree, at least in our country, though it rarely grows as a forest tree. In the cool mountain forests of India it attains a height of 100 feet, no doubt owing in part to its tall forest companions. Stewart and Brandis in their *Forest Flora of India* describe it as abundant in parts of the Himalayan region, from the Indus to Bhotan, but never reaching into the inner, arid zone. By the mountaineers it is held in great veneration as "God's Tree," and its wood is burnt as incense and the houses are decked with its branches at all religious festivals. According to Ledebour it is found in many parts of northern Russia, extending south into the mountains of the Caucasus, and Dr Henry tells me that it is common in the forests of China.

As a Forest Tree. Though the quality of its wood is excellent, the Yew gets such poor treatment in plantations that planters must wish it to be better grown. It is however such a danger to stock that it should be put well inside a wood. Even there it is not safe if cattle can get at it, and thousands of cattle in England have been killed by eating its branches. If there is any choice of ground, it should be planted in rather a free soil, although it will grow almost anywhere, and it should at first be associated rather closely with Larch or some other young tree which suits the soil, so as to get the tree form as soon as may be. We should plant it close enough to grow tall, and yet not get starved. The Larches or other trees should be cut away in good time and the tree allowed room to grow without destroying the leaf canopy. It has the charm of growing upon poor chalky soils where few evergreens will live, and also on the cool and moist sides of hills. At first I should plant it as close as any young forest tree, and alternated with another kind so that the little Yews might be 8 feet apart. As they grew older, 20 feet apart would not be too much, and if the trees grew large they might be given still more room. The Yew is such a beautiful and welcome covert for pheasants that it is worth planting for that reason alone. When we get the trees with tall stems there is much less danger to cattle, as it is the low bush that is most dangerous.

Wood. The Yew yields one of the most compact and tenacious of woods, hard, elastic, close in grain, and so durable when well seasoned as to outlast iron. It is of rich colour when fully matured, ranging from orange-red to deep brown, and often finely streaked and marbled where the trunk divides, while the yellow-white sap wood, worked up, is almost as hard as the darker layers. The Yew is among the best native woods for cabinet work, and little inferior to the best foreign timber, taking and keeping a high polish for many years, and hardly to be told from ebony when stained black. The difficulty is to get it in sufficient quantity and size, and its use is therefore mainly confined to the making of small articles, and thin layers for inlaying. Its resistance to weather fits it for use as piles, posts, and pumps, while in France the toughest axle trees are made from sections of the trunk. Even the lighter branches can be used as hoops and stakes, and from the young shoots are woven baskets which far outlast those of Willow. The wood is long in seasoning, but is so dense that it loses only one part in forty-eight of its bulk. Throughout the Middle Ages this wood was much valued for the making of bows which were the pride of the English archers of the period, but with the decline of archery came neglect of trees which, until then, had been jealously tended.

Old Yew Trees. It would take more than the whole of FLORA AND SYLVA to give an idea of the literature devoted to existing trees in Britain and in Normandy. There is much about them in Loudon's *Arboretum*, and the late Dr John Lowe, M.D., a learned and enthusiastic tree-lover, gave up the leisure of his retirement to the study of the Yew; the result may be found in his book on the *Yew Trees of Great Britain and Ireland*, which will long remain a storehouse of information as to this tree. Many old Yews have only an antiquarian interest, but those who care for beauty should make a point of seeing old trees that show their stems, and these we can rarely find in gentlemen's places. Where trees are isolated, people have such a fear of cutting off the lower boughs, even when half dead, that the stems even of fine trees are not well seen. It is a great mistake, for these lower boughs are often decaying and it benefits the tree to take them away, apart from the gain of showing the colour of the stems.

Yews measuring 30 feet in girth and upwards are to be found at Hamspead Marshall, Berks, 47 feet; Tisbury, Dorset, 30½ feet; South Hayling, Hants, 38 feet; Ankerwyke, Middlesex, 35 feet; Hambledon, Surrey, 39 feet; Buxted, Surrey, 39 feet; Ufcombe, Kent, 35 feet; and at Kyre Park, Worcester, 32 feet. Many of these, and others, may be safely said to be upwards of one thousand years old.

THE BUCKLAND YEW (recently destroyed).

The Yew as a Poison. The one fault of our Native Cedar (as it well deserves to be called) is that it is charged with a poisonous sap which no deadly asp or chemical dose can surpass in virulence. Valuable animals are lost every year through eating the leaves, though the lesson is hard to impress upon stock-owners, and even when the danger is known the cattle sometimes escape into woods where Yews are scattered. The matter has given rise to much discussion as to the season or the special conditions under which the tree becomes so deadly, but from first to last there is ample evidence to show that the Yew is the most fatal poison of all the plants in our land. Some years ago I planted a large group of Yew on a bank and fenced it in with iron, but one night a grocer's horse that came in was attached to the iron fence, and, being a tall animal was able to crop the shoots. It was dead within fifteen minutes of getting back to its stable, about a mile away. A friend in Lincolnshire had some Yew trees in the middle of a large wood, into which a number of young stock broke one night;—forty of them were found sick in the morning, and many of them died. Mr Scott of Burwash also mentions a case near Robertsbridge, in Sussex. A number of valuable horses, brought to the fair, were turned out to spend Sunday in a field belonging to the owner of the inn. This field was bounded on one side by the shrubbery sheltering a garden, and the Yew trees overhung the fence. These conditions had prevailed for years; stock had always been pastured in the field, and there had been many fresh animals sent into it from time to time, and yet within memory no case of poisoning had occurred. The time came, however, when the presence of the Yew led to disaster, for after the horses had been in the field a few hours, the place resembled a bloodless battlefield, being strewn with dead and dying horses.

The now common way of scattering Yew hedges round country houses is most dangerous. When thus recklessly exposed it is impossible to guard against accident. We, who seek the forest tree, are the least likely to be troubled in this way, but no one can be too careful.

Increase.

In selecting Yew plants where timber is the object in view, Selby says that "attention should be given to the habit of the young trees, and those should be preferred which show a strong and upright tendency, with broad healthy leaves; for out of a bed of seedlings there are always some which, instead of advancing upwards, or throwing their main growth into the leading stem, expend their strength upon the side branches. The Yew is best propagated from seeds, and, as the berries are produced in great abundance, there is seldom any difficulty in obtaining a good supply, if only the trees are protected from birds of the Thrush tribe while the fruits ripen. After gathering, they may be either sown at once in their pulp, or be kept in sand during the winter in order to rot off the enveloping matter, and sown in spring; in each of these cases the plant makes its appearance the second year, whereas if the pulp is allowed to dry round the nuts, and these are kept in that state till the following spring, none of them will vegetate till the third year. After remaining in the seed bed a couple of years they should be planted in rows, and undergo the usual routine of the nursery till they are 2 feet high. The Yew may also be raised from cuttings, which strike pretty readily when slipped with a heel and run into soil chiefly consisting of sand, and shaded from the sun; but these cuttings are so apt to grow one-sided and misshapen, that when possible seedling trees should be used in preference." Why, certainly they should, and it is far from a pleasant thought to a lover of the forest tree, that the Yew should ever be increased from a cutting, except in the case of the mere garden forms which can only be multiplied in that way, or by grafting. It is to be feared that the stubby many-stemmed Yews that one sees, are cutting plants, and all who care for the Yew as a tree should go to nurseries where there is no doubt about seed of the wild tree being used to raise the stock. Even with that guarantee it would be well to pick among the seedlings those with the boldest leading shoots.

Varieties. Like some other trees of wide distribution, the Yew has been the mother of many varieties, but not one of these is worth planting from a forest point of view. If one looks at a natural grove of wild Yews, one may often see "sports" on the branches, and the Irish Yew has developed from one of these. I am led to think that very few varieties of trees are ever as good as the wild tree, being mostly short-lived, and unsatisfactory in other ways. No garden varieties of the common Yew should ever be planted in woodland.

REFERENCES.—Loudon, Aboretum, vol. 4, p. 2066; Selby, British Forest Trees, p. 361; Webster, Hardy Coniferous Trees, p. 116; Mouillefort, Principales Essences Forestieres, p. 403; Veitch's Manual, p. 291; Gordon, Pinetum, p. 386; Lowe, Yew Trees of Britain and Ireland; Evelyn, Silva, vol. 1, p. 257; Cobbett, Woodlands, par. 593; Mathieu, Flore Forestiere, p. 508; Hooker, Flora of British India, vol. 5, p. 648; Stewart and Brandis, Forest Flora of India, p. 539.

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IRIS PARADOXA AND ITS HYBRIDS: WITH A COLOURED PLATE OF IRIS "PARSAMB."[*]

THE coloured plate offers a good portrait of this scarce hybrid Iris, raised by Sir Michael Foster from *I. paradoxa* and *I. sambucina*, and but one of many such crosses made by him, one of the best known being *Iris* "*Parvar*" × between *I. paradoxa* and *I. variegata* —a fine dark flower and easily grown. He has also obtained hybrids of *paradoxa* with *I. Lorteti*, *I. iberica*, *I. lupina*, and *I. Meda*, and has even combined in one plant the three species *paradoxa*, *Korolkowi*, and *pallida*. Messrs Dammann of Naples have also used *I. paradoxa* with *I. Swertii*, in producing "*Alkmene*" ×, a plant well figured in the *Gardeners' Chronicle* of June 22, 1901.

Iris paradoxa is a remarkable species of the *Oncocyclus* group (containing some of the finest of all Irises), and if not in itself of the first beauty it is not without charm, and of great interest in its marked characteristics. It has strap-shaped falls with a small, round blade, and the hairs of the cushion or "beard" set as thickly as velvet pile. This feature is present in a greater or less degree in all its hybrids, and is well seen in *Iris* "*Parsamb*," the plant of our coloured plate. *Iris paradoxa* is a native of Persia, Georgia, and the Caucasus. *Iris sambucina*, the pollen parent of our plant, belongs to the *germanica* group and owes its name to the strong Elder scent of its flowers. It is closely allied to *I. squalens*, which has a fainter smell

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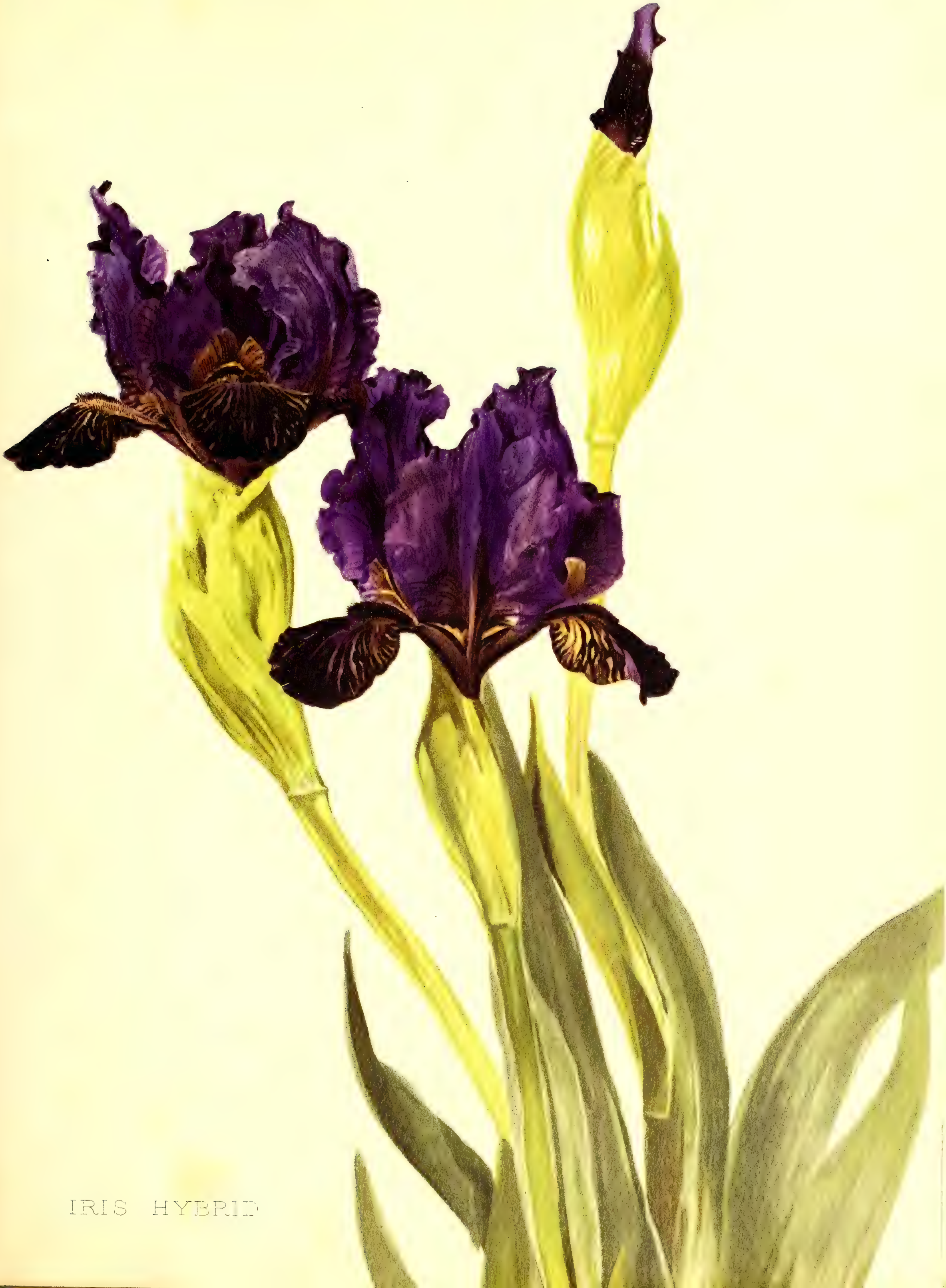
[*] From a drawing by H. G. Moon in the Botanic Gardens, Cambridge.



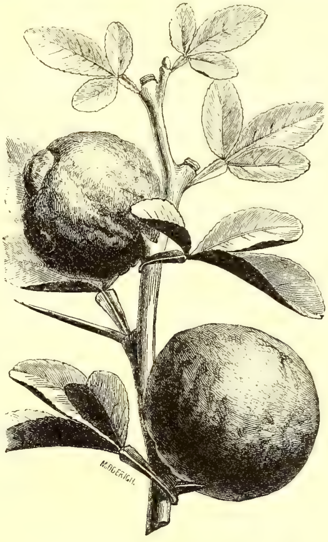
IRIS HYBRID

of Elder, with lilac-purple falls and dull yellow standards tinged with purple, whereas in *sambucina* the falls are claret purple, with lighter shading upon the yellow standards. Both come from Central Europe, extending eastward to the Caucasus. *Iris paradoxa* being one of the easiest to manage of the *Oncocyclus* section, and *I. sambucina* giving no trouble at all, their offspring, *I.* "*Parsamb*," is probably less difficult to grow than any pure *Oncocyclus*. As its leaves tend to grow in winter, it should have a sheltered place at the foot of a south wall, where protection can be given in severe weather, and where, after flowering, it may be shielded by a glass-light from excessive wet. It has done well with me under these conditions, thriving in well-drained, loamy soil, not wanting in lime. R. IRWIN LYNCH.

Botanic Gardens, Cambridge.

THE HARDY ORANGE (*Ægle sepiaria*).

HARDY over a large part of Britain, and utterly unlike any other shrub, it is strange that this little Orange should be so seldom planted. True, the sight of its fruits is only enjoyed now and again, when a mild spring allows the early flowers to set, but its fragrant white flowers never fail to open early in May, and its dark spiny stems are full of interest and make it a real gain. It is of compact habit, prickly as a hedgehog from the large branching spines upon its stems, varied only by a few leaves divided in threes and carried upon short, winged stems. They are never enough to give a leafy appearance, and are thickest on young shoots of the year which have not flowered, unfolding a few days after the flowers and only reaching full size in June. In seasons of free bloom the leaves are always more scanty than at other times, and though they fall in the autumn after turning a clear yellow colour, their loss is hardly noticed. The flowers burst forth singly or in little stemless clusters all along the shoots, and are large, fragrant, and beautiful in contrast with the dark green bark. There is sometimes a second crop of flowers in autumn, especially when the early flowers fail to set fruit. The little oranges are from 1 to 2 inches wide, with a rugged hairy skin ripening to bright yellow, and a very thick rind, what little pulp there is being tough, bitter, and often full of pips. Though rarely plentiful enough for effect in this country, there is now and then a season in which they set freely, sheltered plants in the south and south-west being the best in this way. In the south, and even in the warmer parts of Central Europe, it is nearly evergreen and fruits freely, one small bush often yielding upwards of a hundred fruits. Though far from palatable when raw, the Japanese serve them as a sweetmeat after boiling in sugar, and cooked in the same way by certain French enthusiasts, the green fruits are pronounced excellent, with a peculiar blend of the flavours of Orange and Juniper. The plant is easily raised from cuttings of half-ripened wood, pressed firmly into pots of sandy soil and kept close in a frame until rooted; or from the pips, which the ripe



FRUITING SPRAY OF HARDY ORANGE.

fruits yield in abundance. For seed the fruits should be artificially fertilised and allowed to hang until fully ripe (usually in November), and the seeds then sown at once in pots or pans, and the seedlings planted out on becoming strong. They will grow even when sown in the open during early spring, but most people will prefer grown plants such as may be found in high-class nurseries. They do well in any good warm ground, especially if somewhat dry, as on a sunny slope or at the foot of a sheltering wall, with good drainage and an open subsoil.

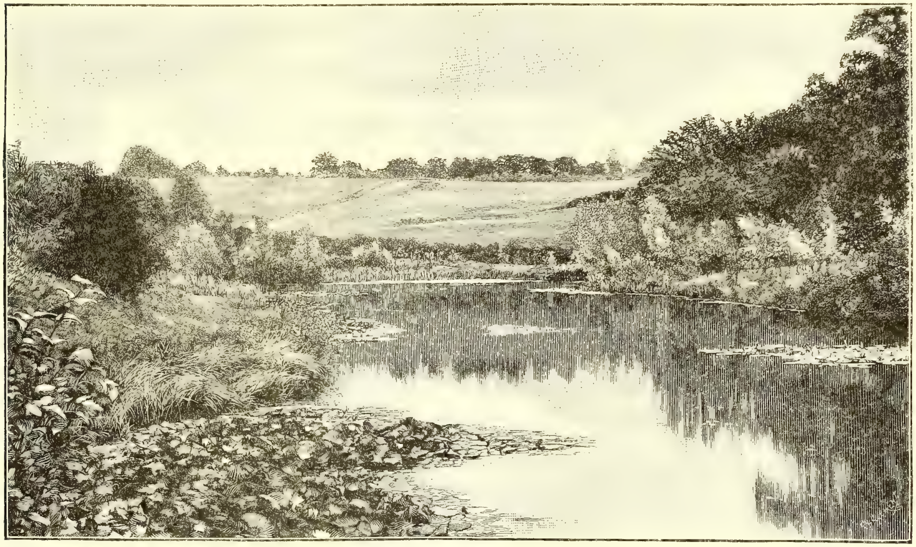
At first this little shrub was grown under glass, until found growing wild by Siebold in the mountain woods of Japan, and planted for fences by the peasantry. In the warmer parts of the United States it is now also much used for hedges, standing any amount of cutting without getting hollow, strong enough to turn any intruder, and proof against rabbits through its bitter bark. For such temperate climates as are unsuited to the Holly, there is perhaps hardly a better plant for this work. Its value is being further tested by the Agricultural Department of the United States, as a stock for other forms of *Citrus*, and with the hope of raising hardy fruits of food value by crossing with the Orange and Mandarine. A first step has already been gained in a hybrid fruit called the *Citrange*, of the size of a Mandarine, very juicy, with few pips, and a delicate scented skin ; its flavour however is too lemon-like to be pleasant, but Dr Webber of the American Society of Horticultural Science regards it as a great step towards the hardy edible Orange, which, from the progress already made, he hopes to see perfected within the next fifteen years. As a stock for climates liable to " cold snaps" its influence is marked, tending to sturdy and early-fruiting trees of hardier character, because starting late in spring and going to rest in good time in the autumn. In the United States its use as a stock has hitherto been mainly confined to the smaller Japanese Oranges :—*Satsuma*, an early fruiting Mandarine, and the *Kumquat*. In New Zealand it is also much used for grafting Oranges and especially Lemons, of which it increases the yield and is said to prevent the disease known as " collar rot." Several distinct forms of the Ægle are said to exist in Japan, and two of minor importance have found their way to Europe—*microcarpa*, with smaller cherry-like fruits, and *punctata*, in which the leaves are covered with glandular dots.

One of the finest of these plants is in Veitch's collection at Coombe Wood, where a veteran of thirty years, fully exposed, but on a slope facing south, has grown into a dense pyramid 8 feet high and 9 feet in diameter, of great beauty when in flower and never injured by frost. In 1901 it fruited freely, with an abundance of good seed, as did also a fine bush at "The Acacias," Worthing, which, though much younger (having been planted barely 15 years) and of late constantly clipped, is now 9 feet high and as much across. Of this plant Major-General Lucie-Smith writes, that it is branched to the ground ; is a sheet of white flowers in May, from the lowest to the topmost twig ; and has never needed any care. Another plant, seemingly the finest of all, is growing in the garden of Bitton Vicarage near Bristol, and has reached a height of 10 feet, flowering freely and fruiting well from time to time, though only a few small and sterile fruits were produced last summer. Canon Ellacombe sends us a beautiful drawing showing how finely it fruits in some years, with a cluster of four or five oranges nearly 2 inches across, upon one small branch. Other fine plants exist at Charmouth, in Dorset, and at Wimbledon, but lest these may be considered unduly favoured localities, we may instance a large plant growing in the Botanic Gardens, Cambridge, where the winter cold is often severe. Of this, Mr Lynch kindly sends the following note :—"This little tree was planted 15 years ago in a well-sheltered corner, and is now 9 feet high and 9½ wide, flowering freely and fruiting more or less as the years are favourable or the reverse. The value of shelter is shown by the fact that when in an exposed border, though proving perfectly hardy, this plant made little progress, and not until in its present warm corner did it start into free growth."

Like so many other plants, this has a long list of names, that now used at Kew being *Ægle sepiaria*. It is however much better known as *Citrus trifolia*, *trifoliata*, or *triptera*, from its leaf divided in threes. B.

THE HARDY WATER-LILIES
(*Nymphæa*).

In the recent story of our open air gardens there have been no gains so good as those which have transformed our waters into veritable gardens of beautiful, hardy plants. Water flowers have a special charm, expressed even from ancient days in the worship of the Lotus-flower, and now that the brilliant Water-Lilies of the tropics have their counterpart in our cold climate, we may look forward to the time when all ornamental waters will be adorned with these star-like Lilies. Of their origin it is not our intention to treat, indeed, though many shrewd guesses have been put forward as to the parentage of this or that group of hybrids, while their raiser—M. Latour-Marliac of Temple-sur-Lot—keeps silent, all that one can do is to gratefully accept his gains without troubling as to the secret of their origin.



Effect of Water-Lilies in Open Water, Gravetye Manor, 1904.

Being of the easiest culture, there are few gardens where these hardy Water-Lilies may not be enjoyed, either on a large scale as shown in our engraving, or more modestly in small gardens. Wherever there exists a trickle of water, we may arrange a water-garden, and in the many places where sheets of water already exist, nothing is easier than to establish colonies of these flowers, of charming effect from June to September. The water is best when rather shallow, open to the sun, renewed by only a small inflow, and if possible sheltered from rough winds by the lie of the land or by a belt of shrubs. Water-Lilies do best in still water, which gets well warmed in summer and not exposed to sudden chill by a cold inrush. Where this risk exists, it is better if possible to arrange another channel, or a series of pools emptying one into the other, the lowest pools being kept for the choicer kinds. The water should be cleared of coarse weeds (best done by draining it off) and in most cases the natural mud is the best soil in which to plant, provided it is about a foot deep. In artificial pools a layer of soil may be prepared by mixing loam with a little sand and some of the rich deposit of grit, leaves, and mud so often left behind by water when in flood. This is the natural food of the Water-Lily, and manure only excites rank leaf-growth and predisposes to disease. Little mounds may be made by laying a few sods together, but if the depth of water makes this difficult the plants may be simply lowered into place—planted firmly in baskets—and the mud pressed around them. May or early June is the best time for planting, and (for established plants) the flower season begins in June, reaches its height in August, and in good years lasts into October. After growing for three or four years, some kinds get too thick and these may be raised and divided late in April; others we have had in the same place for ten years with no loss of health or bloom.

A crowded water-garden is often a matter of necessity, but where space is at command the plants are best in bold groups and far enough apart to keep the kinds distinct, while allowing effective contrast in colour. The depth of water may vary from a foot to as much as 5 feet, but only the strongest kinds will thrive in water as deep as this. The surface effect may be varied by alternating groups of floating kinds with those whose flowers rise above the water, such as *Nymphæas Gladstoniana*, the forms of *tuberosa rosea* and *Richardsoni*, *odorata sulphurea*—which is very bold, *odorata exquisita*, *Seignoureti*, *Andreana*, *Laydekeri lilacea*, and *alba candidissima* — also for bold effects. The flowers vary also as to opening and closing, and while on bright days they mostly fold away about four in the afternoon, in cloudy weather they sometimes keep open even into the early moonlight of a summer's night. But it is perhaps after a sharp shower, when leaves and flower-cups are thickly set with diamond drops, that the water-garden is at its best. The leaves of such strong kinds as *Chromatella* need thinning, and if the fading flowers and damaged leaves can be removed from day to day (by the help of a flower-cutter and long-handled rake), the flower season will be longer. As soon as they open, the flowers may be arranged very prettily in shallow bowls, lasting fresh for several days and fragrant. If care is taken to bend back the sepals when the flowers are cut, the petals are relieved from the pressure which causes them to close, and so remain open until they wither.

Increase. Though some of the finer hybrids make few side crowns and thus increase slowly, others may be freely divided, the offsets being cut away with a bit of the old stem attached, and grown in a tub until well rooted. Some kinds—mostly of the *odorata* and *tuberosa* sections—are easily increased from seed, but many kinds are sterile, in others seed is slow in germinating, and the seedlings are so liable to degenerate that this way of increase is not much followed. The flowers sink upon the third day, and, ripening under water, open half-way when mature to allow the seeds to escape. They are at first held together by a mass of jelly-like matter and float for several hours, and during this time may be skimmed from the surface and sown at once in pans of mud. Care must be taken not to disturb the soil when adding water, and if placed in a warm and sunny corner the seedlings are not long in starting.

Pests. Though free from many enemies of the garden, the Nymphæas have foes of their own which must be held in check. Weeds must be kept under, such things as the Water Starwort and Floating Pond Weed giving trouble, the last pest with its brittle roots being especially difficult to get out. A thick coat of floating weeds, not only chokes the Lilies, but may keep the water too cold. In early summer the grubs of the caddis-fly gnaw the young leaves and stems, and water snails so load them with eggs as to cause curling and distortion, but as a rule the plants outgrow these troubles with the warmer days, and have more to fear from rats and water-fowl when in full bloom. In small ponds these may be kept under, but in larger sheets of water they often do harm, gnawing the buds before they open and even carrying them off to build their nests. Green-fly also appears upon the leaves and flowers above water, and grubs of various kinds attack them, but spraying with a weak solution of quassia will generally clear the emergent leaves and flowers, while a few drops of a mixture of three parts of colza to one of paraffin, will spread over the water and check the foe underneath.

Dish of Cut Water-Lilies.

In Tubs. If a water-garden is impossible, many of these charming plants may still be grown in tanks or tubs, choosing kinds of the *Laydekeri* section, and the forms of *Nymphæa tetragona*. If in tubs, these should be as wide as possible and about 2 feet deep, allowing for soil and 12 to 15 inches of water, and are best sunk in the ground to preserve an even temperature. If possible a trickle of water should pass from one to another, but if drawn water must be used for refilling, it should first stand in the sun to get warm. Sunk thus in a grass plot, a pretty collection may be enjoyed, and frost kept out in winter by a covering of boards, overlaid with straw and mats whenever necessary. Tanks may be built to suit any conditions, the great point being to avoid overcrowding a small space. The yellow kinds are too strong for this way of growing, save *tetragona helvola*—a little gem with pale yellow flowers and a long season. Plants of the *Laydekeri* group are all of medium growth, free in flower, and rich in colour which deepens from day to day ; these kinds, with a few of the *odorata* section such as *odorata alba*, *alba minor*, *rosea*, and *lucida*, and the beautiful *caroliniana*, with all the forms of *N. tetragona*, are the best for tub-culture.

Times of Flower. The kinds vary as to earliness and length of season. Among the earliest are *Laydekeri rosea* and *lilacea*, and *caroliniana perfecta*, all of which sometimes show flower by the end of May. *Laydekeri rosea* not only begins early, but keeps in flower all summer and as late as any in autumn, and the newer kind, *N. colossea*, so well shown in our engraving, is almost as good in this way and quite one of the best for effect through a long season. The Swedish Water-Lily (*N. alba rosea*) is also among the first, but is not free in flower and dies away early. *Ellisiana*, *aurora*, and *Andreana*, are all early when well established, and closely followed by *gloriosa*, *lucida*, *fulva*, and the forms of *N. Marliacea*. The old white Water-Lily (*N. alba*) is two or three weeks behind the earlier hybrids, showing a gain in length of season which is yet more pronounced in the autumn. It is the end of June before the forms of *N. odorata* are much seen, and *odorata sulphurea* often waits for July, but when once started, this class flowers well into the autumn with such kinds as *Laydekeri rosea*, *pygmæa helvola*, and a fine new cross known as *Brakeleyi rosea*, all of which keep on into October in a fine season.

As to Kinds. The colours not only vary somewhat according to season—whether early, full, or late—but also as to its dull or sunny character, while kinds such as *aurora* and *Laydekeri* vary from day to day, and upon others like *Marliacea albida* the nature of the soil has a marked effect. In this way such kinds as the *Marliacæ* group grow paler from the first day, while all the *Laydekeri* group deepen with age. The best dark Lilies are perhaps *Froebeli*, *sanguinea*, and the lovely *William Falconer*, though *fulgens*, *purpurata*, and *atropurpurea* are all good, and, though free in bloom spread so slowly that they may remain untouched for several years. The American variety, *James Brydon*, must also be classed with the best new sorts. Shades of orange deepening to brick-red are seen in *fulva*, *aurora*, *Robinsoni*, and *Andreana*, the two last coming very near ; *Andreana* is a little the larger. Among pink flowers *caroliniana perfecta* is truly near perfection ; *William Doogue*, *odorata exquisita*, *colossea*, and *Brakeleyi rosea* are also very fine. Short-stemmed plants like *odorata suavissima*, *o. exquisita*, and *o. rubra*, are best in the shallow water that suits *Laydekeri lilacea* and *rosea;* whereas all the forms of *N. tuberosa* are best by themselves, and in deep water. The Swedish Water-Lily does best in cool water. For fragrance, all the forms of *caroliniana* are good and especially *perfecta*, other very fragrant flowers being *Arc-en-ciel*, *Froebeli*, and *Brakeleyi rosea* among the newer kinds, with *Marliacea albida* and *rosea*, and the forms of *odorata*. The flowers of *odorata sulphurea* are distinct from all in their odour of vanilla, their cactus-shape, and their delicate colour.

Nymphæa alba.—The British White Water-Lily, found in many parts of our country and throughout Europe to Siberia. The flowers, of 4 to 6 inches across, float upon the water amid rounded leaves of bright green, very variable as to size, and reddish while young.

N. alba var. *candidissima.*—A large-flowered form sometimes called the Hampton Court Lily. Its white flowers are broader in petal, coming early and continued late, and thrust well above the water. Its growth is strong, needing ample space. Leaves of yellow-green while young, the leaf-lobes much curved and overlapping. At certain times and in certain soils, the sepals are flushed with rose-colour.

N. alba var. *delicata.*—With flowers flushed with pale rose.

N. alba maxima.—With large flowers.

N. alba minor.—A small-flowered variety with blooms of great purity, and prettily incurved.

N. alba var. *plenissima.*—A form with large, nearly double flowers, produced through a long season.

N. alba var. *rubra.*—A scarce plant, best known as the Swedish Water-Lily, and classed as a form of *alba*, though distinct in its smaller leaves of different shape, slightly rolled inwards at the edges, olive-green above and dull reddish below. The flowers are smaller, fuller, and more refined, with broader and blunter petals. It blooms early but soon goes to rest. With so short a season it spreads slowly, is averse to removal, and also to hot weather. The flowers vary from pale pink to a deep magenta, deepening towards the centre of the flower and from day to day. Seeds freely, but the seedlings mostly revert, only the tiny slow-growing plants coming true. Syns. *N. alba rosea*, *N. Caspary*, and *N. sphærocarpa.*

N. alba-rubra var. *Froebeli.*—An improved form of the Swedish Water-Lily raised at Zurich, and of deeper colour and stronger growth. Of good size and fragrant, its flowers are of deep crimson with orange stamens, coming freely to the end of September. It is one of the finest dark kinds, thriving in exposed open water, and is effective in the distance.

N. alba var. *urceolata.*—A much incurved white flower with a dark centre.

N. Andreana.—Bears cup-shaped flowers of brick-red colour shaded with orange, and held well above the water. The leaves are blotched with chestnut-brown, their lobes overlapping, and with such long stalks that they float out far apart. The flowers come so freely that a score or more are sometimes open together on one strong plant.

N. Arc-en-ciel.—A distinct plant with blending shades of pale salmon streaked with rose, and crimson-spotted sepals. The leaves are variegated in white, rose, and shades of green and bronze.

N. Arethusa.—A plant of strong growth and very free, coming near *Laydekeri fulgens* in its bright crimson colour, but larger in flower and more robust.

N. atropurpurea.—One of the new kinds and the darkest of all, with very large flowers of deep port-wine colour, with pale yellow stamens and petals incurved at the tips. Of good growth, free, with dark leaves shaded with red on their under surface.

N. Aurora.—So named from its changing tints, which vary from a pale rosy-yellow on opening, to orange or reddish tones on the third day, different plants showing much variation in depth of colour.

N. Brakeleyi rosea.—A new cross, with the foliage of *N. tuberosa* and the form of *odorata rosea* in its large flowers of clear carmine. It is strong and very free, fragrant, and blooms far into the autumn.

N. candida.—A plant coming from Styria, and so near *alba* as to be often called the Bohemian form of it. The flowers are small and very white, with a reddish-brown centre. Seeds very large. Syns. *Ns. semiaperta*, or *biradiata*.

N. Carrisbrooki.—A new kind raised in California, and described as bearing flowers of bright flesh pink, and very fragrant.

N. chrysantha.—A new and handsome kind of medium growth, and deep yellow flowers passing to orange-red, with a cluster of bright red stamens ; leaves edged and marbled with bronze.

N. colossea.—Very large in leaf and flower, blooming with the earliest and lasting well into the autumn. Leaves of fine form, rich green above and brown beneath. Fragrant flowers of pale pink or flesh colour, the outer segments of pale olive-green, and pale-yellow stamens. Thrives in open water in deep pond mud, and is quite happy even when much exposed. Our fine engraving is from a plant grown under these conditions for several seasons past, at Gravetye Manor, Sussex.

N. Ellisiana.—One of the best, and so rich in colour as to be conspicuous at a distance. Large broad-petalled flowers of reddish-crimson with orange-red stamens. A plant of robust growth and free in flower.

N. flava.—This hardly ranks among hardy Water-Lilies, for though it will pass a mild winter uninjured, and may even survive for several years in the warmest parts of Britain, a severe frost is often fatal, especially after one or two cold seasons. Though found in the southern states of North America, it is probably only a form of the Mexican Water-Lily, and was long lost sight of, until rediscovered in the warm lagoons of Florida. Its growth is weaker and more slender, and the flowers fewer and paler than in the Mexican plant. Its flowers are rather small, clear pale yellow, standing well above the water on slender stalks, and open from early morning till late afternoon, sinking at the end of the second day. Instead of a thick rhizome this has a mass of fibrous roots, and spreads as freely as any Strawberry by means of long runners which root as they go : the roots are never quite at rest, and possibly this has something to do with its tenderness. Under glass it is pretty and distinct, but it starts late in the open, and only blooms well in warm seasons.

N. fulva.—Bears medium-sized star-shaped flowers, curiously incurved at the tips of the petals, and sweetly scented. Its colour is rose upon yellow, with yellow stamens, the red growing deeper towards the centre and brightening with age. Leaves spotted with brown above, and suffused with red beneath.

N. Gladstoniana.—An American seedling with white flowers of great size, sometimes 8 inches across. They are free from all trace of colour and stand well above the water on stout stems, the whole plant being of free and open habit. One of the first to bloom in spring, and the last flowers are only cut down by autumn frosts.

N. gloriosa.—Bears massive flowers 7 inches across, rich dark red with orange-coloured stamens, and fragrant. Being slow to spread and difficult of increase, it should be left for several years undisturbed, and while of strong growth, it sometimes dies off suddenly. The flowers are very full, and floating, the lower petals often prettily tipped with rosy-white during the heat of summer, becoming deeper and more uniform towards the autumn. This is the only kind always bearing five sepals.

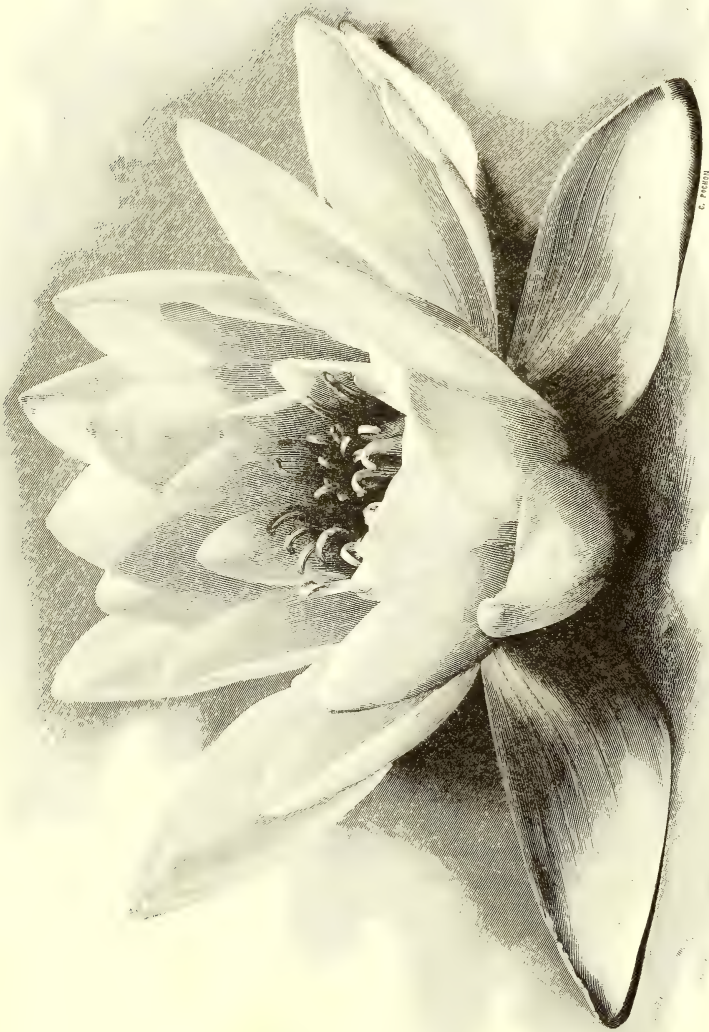
N. gracillima alba.—A pure white kind raised by M. Marliac, with flowers of 6 to 7 inches across, very full of petals, and fragrant.

N. graziella.—A new French seedling of peculiar orange-red colour streaked with green, flowering without a break till quite the end of the season.

N. James Brydon.—A new American seedling with full flowers of 4 to 6 inches wide, of deep rose-crimson shading to magenta when mature ; petals finely rounded and curving inwards, with a paler, silvery sheen beneath, and stamens of bright orange. An excellent and distinct kind, quite hardy.

N. James Gurney.—Also from America, with fair-sized flowers of deep rose, coming near *N. Ellisiana.*

N. Laydekeri fulgens.—A flower of fine colour and beautifully cupped, the rounded petals of crimson-purple showing paler within and enclosing a cluster of vivid red stamens. Like



NYMPHÆA COLOSSEA. *Engraved for "Flora" from a Plant in Open Water at Gravetye, for several Years.*

all of this group, it is a good plant for tubs and small tanks.

N. Laydekeri lilacea.—Very free in its small flowers of soft rosy-lilac tipped with clear pink, their colour deepening to rosy-crimson on the third day. They are held well above the water, shining with an almost silvery lustre in bright sunlight, and scented like a tea-rose. The plant does best in shallow water, and is one of the earliest to show flower. Syn. *N. lilacina.*

N. Laydekeri purpurata.—A telling flower, larger than others in this group and very shapely with its long-pointed petals. They are early, free, and fragrant, of a conspicuous shade of wine-red with orange-red stamens.

N. Laydekeri rosea.—One of the most useful of hardy Water-Lilies, with fragrant, pale-pink flowers, opening about 11 A.M. and passing through several shades to deep-rose as they fade away. It does best in shallow water and gives so few offsets that several plants should be grouped to secure the full effect of the changing flowers.

N. Laydekeri rosea prolifera.—In this form the one fault of the parent—its difficult increase—is met by a free yield of offsets from the fleshy rhizome. These bloom when small, surrounding the parent with a succession of flowers, and providing increase. From this point of view it is a valuable gain.

N. luciana.—Like *odorata caroliniana* in all save the deeper and uniform rose-pink of its medium-sized flowers.

N. lucida.—Comes near to *L. rosea* but of far stronger growth, with massive flowers opening starwise and rosy-vermilion in colour, paling towards the edges and the tips of the petals and deepening towards the cluster of orange stamens. The leaves, borne upon very long stems, are bold and finely blotched with chestnut-red above and reddish streaks beneath. Does well in fairly deep water.

N. Marliacea albida.—A superb plant, thriving in deep water, where it should be sometimes thinned to avoid overcrowding; its massive white flowers of 8 or more inches across, are pushed well above the water, and last into October. They are of glistening purity, fragrant, and very full of petals guarding the cluster of golden anthers. The guard petals are long and broad, but inside they grow shorter and narrower towards the centre. The outer petals are also often flushed with pink at the base, and the stamens show traces of the same colour when the plant is in heavy soil. In large groups its general effect is almost dazzling.

N. Marl. carnea.—A noble hardy plant, in colour a soft flesh-pink, deepening towards the base of the petals and paling gradually to white. It grows well in shallow or deep water, flowering late, and showing its vanilla-scented flowers well above the dark leaves.

N. Marl. chromatella.—The first yellow kind sent out, a free and fine plant, but apt to get crowded, and when this happens it does not flower so well. Being vigorous it is a good plant for deep open water, where its large flowers of canary-yellow show finely against the dark brown leaves, and remain open for a long while each day.

N. Marl. flammea.—A handsome though inaptly named flower of medium size, being a deep wine-red rather than flame-colour, with red stamens and petals flaked with white towards the tips. Leaves streaked with reddish-brown.

N. Marl. ignea.—One of the brightest in its uniform carmine-red, deepening slightly towards the crown of vivid orange-red stamens; sepals pale olive-green edged with rose beneath, and paler above. Though not large, the flowers are good in colour, composed of eighteen cupped and shapely petals.

N. Marl. rosea.—Another stout grower, thriving in deep water to which its long slender stems are suited. Flowers rose colour, changing to flesh-pink, broader in petal and fuller than in *M. carnea*, with the colour deepening towards the tips. Young leaves purplish-red, changing to deep green.

N. Marl. rubro-punctata.—Flowers of great size borne freely and through a long season. Petals rosy-purple, tipped and flaked with pink; stamens orange-red.

N. nitida.—A very hardy little plant from Siberia, variable as to size of leaf and flower, its *minor* form, with very small starry flowers, coming near *N. tetragona.*

N. odorata.—The white American Pond-Lily, common in the eastern States and with all the beauty of our own, and fragrant. It varies much in size and colour, and (being of moderate growth) is well suited to tanks. The leaf may be anything from 5 to 10 inches across, nearly round, and purplish when young, changing to pure green and reddish beneath. Flowers of 3 to 5 inches, composed of narrow pointed petals, long in the bud, which, from the red edges of the sepals, seems to give promise of a pink flower.

N. odorata caroliniana.—Originated in an American garden as a natural cross between *odorata* and *tuberosa*. The leaves are green above and red beneath, and though nearly a foot across when fully grown, the plant is only of moderate growth and not too vigorous for a tank. Though easily divided, the plant is best left alone for several years, gaining in size of flower, which become 6 or more inches across, composed of very narrow pale pink petals, deepening in colour towards the centre. The flowers vary through several shades of colour, according to soil and climate, the following varieties being fairly constant: *nivea*, with very double pure white flowers, narrow petals and rich yellow stamens; *perfecta*, with semi-double flowers of the same narrow petals, but more rounded at the tip and deep flesh or salmon in colour; and *salmonea*, a strong form with flowers of decided salmon-pink. *Caroliniana* and its forms are all strongly fragrant. Syn. *N. tuberosa* var. *superba*.

N. odorata delicata.— A small neat form, with rosy-tinted flowers.

N. odorata exquisita.—Finely-shaped rosy-carmine flowers of medium size, with narrow, pointed petals and golden stamens; they are the darkest of this group, and stand well out of the water. Leaves green above and intense red below. A French seedling of moderate growth.

N. odorata gigantea.—The larger, southern form of *odorata*, found from North Carolina to Florida, and known as the Rice-field Water-Lily. It is of great vigour, delighting in deep water and flowering early in the season, but not in the autumn. The leaves are very large, sometimes measuring as much as 16 inches across, and dark green tinged with purple towards the edges which are often partly rolled inwards. The flowers—4 to 7 inches across—are pure white with green sepals, slightly incurved, and nearly scentless.

N. odorata maxima.—A wild form, also known as *superba*, differing widely from the parent in its larger cup-shaped flowers, with spreading petals very broad at the base, and free from any trace of colour. Found only in New Jersey.

N. odorata minor.—A pretty little plant of slow growth, and one of the best for tanks and shallow water. The starry white flowers are 2 to 3 inches across, with purplish sepals and sweetly scented, though forms occur that are almost without scent, and others with flowers more or less incurved. The leaves are small, bright green above, and deep red beneath. A native of the shallow bogs of New Jersey. Syn. *N. pumila*.

N. odorata rosacea.—A good form coming near *exquisita* but more vigorous, with bright rosy flowers about 4 inches across, paling to salmon-yellow towards the crown of golden stamens; petals narrow and pointed.

N. odorata rosea.—The Cape Cod Water-Lily—a plant of moderate vigour, with petals of a uniform bright rose colour with yellow stamens, and fragrant. It begins early, and seeds so freely that (unless the dead flowers are kept cut) its season is short. The flowers also lose colour quickly when fully expanded, and will sometimes burn in hot sunlight. Leaves rather small, deep red on both sides while young, becoming dark green. South-east Massachusetts.

N. odorata sulphurea.—A beautiful plant, distinct from all other kinds in the cactus-shape of its flowers, and resembling the Yellow Mexican Water-Lily (*N. mexicana*) or its American form (*N. flava*). It is a plant of strong growth, forming many crowns and a profusion of clear yellow vanilla-scented flowers, from July into the autumn. Though not much above medium size, they are conspicuous, rising well out of the water, and the long pointed buds open early in the day. The leaves rest on the water unless crowded, and are evenly rounded, and finely blotched and marbled. It is slow in starting to flower, hardly beginning until July.

N. o. sulphurea grandiflora.—A fine form of *sulphurea*, with the same starry cactus-shaped flowers, but much larger, fuller, and of paler yellow. Though its parent is one of the latest, this kind is the first in bloom and bears the largest flower of the *odorata* group, opening out very flat, with narrow, crowded petals of elegant effect. It is free in flower when well established, and makes many crowns, with bold foliage of paler green, less mottled above, but covered beneath with reddish blotches.

N. Robinsoni.—A star-like flower of distinct and complex shades, best described as reddish-purple deepening towards the centre, which shows traces of an orange ground, paling again towards the tips of the petals as a white or creamy-yellow suffusion. The flowers are of medium size, with pointed and sharply tapering petals, and they last longer than almost any other kind when open. Leaf dark green, blotched with chestnut above and on the stems, and reddish below.

N. sanguinea.—The deepest in colour of the smaller Water-Lilies, with flowers which deepen from clear carmine to deep ruby crimson, with dark orange-red stamens.

N. Seignoureti.—One of the older hybrids and coming near other kinds such as *Lucida* (which is better worth growing), its colour being dingy and indistinct. The flowers are dull yellow washed with rose, and are held several inches above the water. A compact grower, with small but dense leaves, finely spotted.

N. suavissima.—A new seedling raised in France, with deep rose-pink flowers of 6 inches, very full of narrow petals, and fragrant. Probably a form of *N. odorata*, of good compact growth.

N. tetragona.—The smallest of Water-Lilies, with little flowers 1½ to 2½ inches across and pure white with yellow stamens, opening for three or four days from noon till about 5 P.M. The leaf is as large as the palm of the hand and shaped almost like a horse-shoe, with the lobes wide apart; coloured dark green above and reddish below. This kind and its forms thrive well in tanks, forming no offsets and spreading slowly, though free to flower from May to the end of September. It is grown from seed. N. Asia and parts of N. America.

N. tetragona var. *Helvola.*—A seedling with pale yellow flowers 2 inches across, open during the afternoon and slightly raised above the water. The leaf is oval and yet smaller than in the parent, and freely blotched with brown. It thrives in shallow water with a long season of flower, while a dozen or more blooms may often be counted at once upon a strong plant. In hot sunlight they sometimes come flushed with rose.

N. tetragona var. *himalayensis.*—A small-flowered Italian seedling, with floating blooms of about an inch, coming from May to October. It seeds freely, and the seedlings bloom well in their second year.

N. tuberosa.—The vigorous Water-Lily of the western and north-western United States, thriving in deep water, lifting its flowers high out of the water, and spreading rapidly by long tuberous offsets. It should therefore be planted by itself in deep water, but only flowers freely under a warm sky or in hot summers. Its season coincides with that of our native Water-Lily, the flowers opening from early morning to early afternoon, and lasting three or four days. They are creamy white, without a trace of colour in the sepals or petals, which are longer and broader than in any other wild kind, and scentless. They vary from 4½ to nearly 9 inches across, and bear larger seeds than any other kind. Leaves large, 8 to 12 inches across, and rising from the water when crowded or near the surface. This wild plant is so vigorous that it is best not planted in the same pond with the finer hybrids. Syns. *N. blanda*, and *N. reniformis.*

N. tuberosa var. *maxima.*—A form found in Lake Hopatkong, New Jersey, growing in deep water, and supposed to be a wild cross between *tuberosa* and *odorata.* It is of smaller growth and blooms later than the parent, with cup-shaped pure-white flowers, prettily shaded with green upon the outer petals. The flower-stalks bear long hairs and a few faint brown streaks. Syn. *N. odorata maxima.*

N. tuberosa var. *Richardsoni.*—An American seedling with double pure-white flowers standing well out of the water; they are of finely rounded petals, curving inwards, the outer row and the sepals slightly drooping. Its subdued growth and distinct globe-shaped flowers make it one of the most distinct of white Water-Lilies. Syn. *N. tuberosa plena.*

N. tuberosa var. *rosea.*—A new variety and a supposed natural cross with the rosy Cape Cod Water-Lily. It is nearly as vigorous as its parent, with large pink flowers rising above the water, and opening widely to show the crown of bright red stamens. A good plant for deep water.

N. vomerensis.—A supposed cross between *N. tetragona* and a small Italian form of *N. alba.* Its floating flowers are intermediate in size, snow-white, fragrant, and borne freely through a long season. It grows well in pots and in small fountain-basins, coming fairly true from seed.

N. William Doogue.—An American seedling with large flowers of soft pink, very broad in petal, much cupped, and evenly coloured throughout. A charming plant and quite hardy.

N. William Falconer.—An American gain, and a flower of striking colour, considered by some as the best dark Water-Lily. The blooms are large (6 or 7 inches) and deep crimson, shaded with purple, and bright yellow in the centre. The young leaves are bright red, changing to deep green, with veins of reddish purple. B.

DAVIDSONIA PRURIENS.

A RECENT issue of the Belgian *Revue de l'Horticulture* gives a coloured plate of this rare hot-house plant. Though not quite new, it has shared the fate of many good stove plants and is now almost unknown even in books of reference, and, upon its reappearance, was welcomed by many as a new plant of great beauty. It is of erect growth, putting forth finely-arched leaves of about 2 feet composed of five or six pairs of leaflets, threaded with red veins, and drooping slightly on either side, and a large terminal leaflet of 6 to 9 inches, accentuating the drooping habit. The charm of the plant lies in the deep crimson colour of its young leaves, several of which are in beauty at the same time so long as the plant continues in growth, which, with good management, covers a long season. The stems and leaf-stalks are covered with short stiff hairs which, while adding to the effect of the plant, create an unpleasant itching if handled unwarily by persons of sensitive skin. The Davidsonia needs only warmth and moisture, and is readily grown from cuttings of the stem, rooted in sand, under a handlight in bottom heat. So graceful and elegant a plant, which is also easily grown and always in beauty, is worthy of note where constant colour is in demand.

THE SHRUB GARDEN.

THE advent of M. Maurice de Vilmorin's catalogue of shrubs (*Fruticetum Vilmorinianum*) sets us thinking of one of the most important subjects that concern lovers of the outdoor garden, and that is the shrub-garden. If judging solely by catalogues, one would hardly say that these were neglected, but as a fact they are. How often, even in places where the garden is made much of, do we not see a great expenditure on things of quite a temporary interest, plants blooming for one season only and not always good for that time, while no real care or thought is given to shrubs, other than the commonest? Witness the expenditure upon half-hardy plants in the London parks, where little or no thought is given to shrubs; and it is so with many other places. Beauty is entirely with the shrubs, and endurance also; a group of hardy shrubs may be lovely for a generation and without care, and this can be said of few other plants in cultivation. Not a few beautiful hardy shrubs will thrive too without the rich and laborious cultivation usual in gardens for many things of less value. There is often much talk of pruning in our gardens, and many learned essays are written about it; but it is a very simple matter, in proof of which I have a colony of shrubs on a hot bank facing south, and in soil that bakes in hot weather; for the sake of keeping the bank free from sun-bake, these shrubs have not been pruned for many years and now form a dense mass, with their dead leaves of past summers covering the ground underneath. Although not pruned, they flower beautifully every year, thus showing how little care is required by shrubs as compared with other things, though in some cases pruning must not be neglected. Our ways of arranging shrubs must be changed, before we have any real advance in the cultivation of these beautiful plants, for the general mixture of different shrubs tends to the destruction of the choicer kinds, so that to make progress we must group, and not bury them in our shrubberies.

Turning again to M. de Vilmorin's well printed and interesting list, we may perhaps glance over the families of which the least good use is made in British gardens, beginning with the Clematis—the most graceful of all climbing shrubs, though so little is generally made of the wilder kinds, notwithstanding that these are as pretty as the large-flowered kinds, good as these are. As not having yet come under the regime of grafting, these wild kinds are much less likely to perish. But even few gardens are adorned with the large-flowered Clematises, as they might be if a more simple and natural mode of increase were employed. Even such beautiful wild kinds as *campaniflora* of Southern Europe, with flowers like a climbing Hairbell, are very seldom seen. The Magnolias are so showy that they are more planted, although the hardier kinds are not seen nearly enough. Passing over a number of rare and beautiful shrubs such as Berberidopsis, we come to another great family, the Barberries, of which good use might be made much more often, though not without regard to their habits. The evergreen kinds may do best in the warmer and moister districts, but the summer-leafing kinds are hardy in all parts. Some good kinds of Barberries are not yet introduced, and several of them are figured in M. de Vilmorin's list. The Rock and Sun-roses are effective in all free and sandy soils; here we want to get the less known species, and above all, to place them in sunny positions, grouped, and apart from other shrubs. The Azara is a still uncommon group which may give good effects, even away from walls, adding distinct variety to our evergreens. Stuartia is a lovely genus which thrives in our climate and has never been made half enough of, though quite hardy. When grouped, Skimmias are among the most cheery and effective things that one can see in winter, hardy, good in habit, and brilliant in fruit, though here again we never get their true beauty, unless we plant groups. The Hollies, over all the northern and cool parts of England, and indeed everywhere, are among the most important of evergreens. Some of the exotic kinds are well worth growing, such as the American Holly; but if we only had the forms of our own wild Holly, as one may see them in that most interesting nursery at Sheffield, we should still be rich. Euonymus are, in their hardier forms, very interesting and beautiful, and some of the best kinds are not yet in nurseries. Ceanothus—American shrubs of much beauty—are charming in their blue forms (particularly some of the hybrids) and are best in rather sunny places and free soils. The Vines are uncommonly rich of late, as we know from the collection of Messrs Veitch and others, and between the older varieties of the European or

Asiatic group, and the wild American and Chinese kinds, there is certainly no scarcity of handsome and brilliant-leaved climbers. The Brooms, often neglected in nurseries, are beautiful and, though short-lived, singularly brilliant and fine in colour. Numbers of Brooms are not yet grown in gardens. The same may be said of the more graceful Indigoferas, which are very pretty shrubs, some of them not yet increased in our nurseries. The Prunus, from China and North America, give us pretty bushes, apart from those already in cultivation in the form of Double Cherries. Several new kinds are figured in the *Fruticetum*. Spireas are more grown, but evidently there are other beautiful things to come, and a promising one is figured here as *Sobraria asurgens;* the name used here for the kinds of this Lindleyana group. Of recent years the wild Roses have had more attention paid to them, and the more distinct kinds well deserve it. Several new or rare forms are figured here, whilst an immense list of wild kinds is given. The Hawthorns have acquired a new interest from the number of kinds found of late years in North America, and though some may not be distinct as garden shrubs, still they are very promising as a whole and nurserymen should select the best and raise them from seed, for grafting has lost many of the Hawthorns introduced to our country. Cotoneasters, or "Rocksprays," have been with us a long time but enough has not by any means been made of these fine shrubs, and here some new and interesting forms are figured. Amelanchiers and Aronias are very seldom seen with us in any effective use, the last named being a small kind of *Pyrus* which is effective if well-placed. Deutzias have been made more interesting of late, both the introduced kinds and the garden hybrids, and the same may be said of the Philadelphus, both groups figuring in this list, with Cornus, which generally cuts a poor figure in our gardens, spite of late introductions. But perhaps of all neglected shrubs none are so much so as the Honeysuckles, of which we see only one or two kinds in gardens. In a very large genus like this, there are plants of little garden interest, but there are also many of the highest beauty which suit our cold climate and our tastes, and some of our botanic gardens could hardly do better than get together a collection of the more distinct kinds of Honeysuckle. Evergreen shrubs have been much better grown in England than elsewhere, though here too there is immense room for introductions and for more effective usage. Among the more beautiful shrubs lately introduced are some forms of Buddleia, which are really fine additions and apparently hardy and vigorous. There are lengthy lists of two plants—Smilax and Ephedra—both very distinct and in the case of Smilax very fine in habit, yet hardly ever seen in gardens.

In making this rich collection of shrubs and giving us such an instructive list of them, M. de Vilmorin has done us all a precious service. Such collections are indeed rich mines to draw upon. To get them together takes so much space and care, that it is impossible to group the kinds so as to get their finest effects. It is for us—gardeners pure and simple (an older race even than botanists)—to do our work next, which is to select the new and beautiful from such collections, adapting them to our soils, our wants, and our tastes, and above all to get from them natural and picturesque effects; and in this way we have much to do.

MECONOPSIS: WITH A PLATE OF MECONOPSIS INTEGRIFOLIA.*

This is a new plant as to whose garden value it is not possible yet to say anything definite. The doubtful factor is its seeding power. My plants were raised from seed collected by the Koslov Expedition in Central Asia. Messrs Veitch owe theirs to Mr Wilson's collections in the China-Thibet borderland. My plants, even with artificial pollination, have so far failed to produce good seed; and from Messrs Veitch's recent advertisements of "seed gathered in China," it seems possible that they have had no better luck in their drier and more southern position. This is of course of no importance while Chinese seed can be had; but a collector in China is an expensive affair, and, in default of Chinese seed we may find ourselves hopelessly in love with a plant which dies after flowering, and cannot be propagated. For the plant itself I have nothing but praise. Not the least of its merits is that it is best in the open air, the colour coming poorer and paler under glass. Hardy in constitution; caring nothing for frost; alpine in stature and habit; almost as desirable for its silky foliage as for its magnificent flowers; *Meconopsis integrifolia* charms at once all who see it. But—is it going to be a permanency? Can we produce in Europe the conditions of Central Asia?

The fact is that, with one notable exception, there is a fatal strain of insecurity about the Meconopsids. We give them our devotion as we give it to the *Oncocyclus* Irises, with a feeling of reasonable certainty that we are going to lose them. The very delicacy of their beauty seems to convey a warning. *M. integrifolia* refuses to seed. *M. Wallichi* gives us at its best that particular shade of blue, which is to some of us the most desirable of all colours. But it is liable to deteriorate into washy puces quite passing endurance. *M. nepalensis* true (probably not now in cultivation), is worth growing for its foliage alone, but the flowers approximate to *Geranium phæum* at its worst. *M. aculeata* is surpassed in beauty by no flowering plant. The groundwork of its colour is the blue of *Delphinium Belladonna*, the surface dusting is milk, and the central boss of stamens the colour of old gold. But in the third generation you will hardly get good seed. The perennial *M. grandis*, here at Neston at any rate, under the damp Cheshire skies, refuses to disclose its beauty out of doors. If the wonderful iridescence of its petals is to be fully displayed, it must be flowered under glass. *M. paniculata*, as perfect in yellow as *aculeata* and *Wallichi* are in blue, is perhaps the most reliable of the Himalayan kinds, and the first flowers to open generally give a little good seed.

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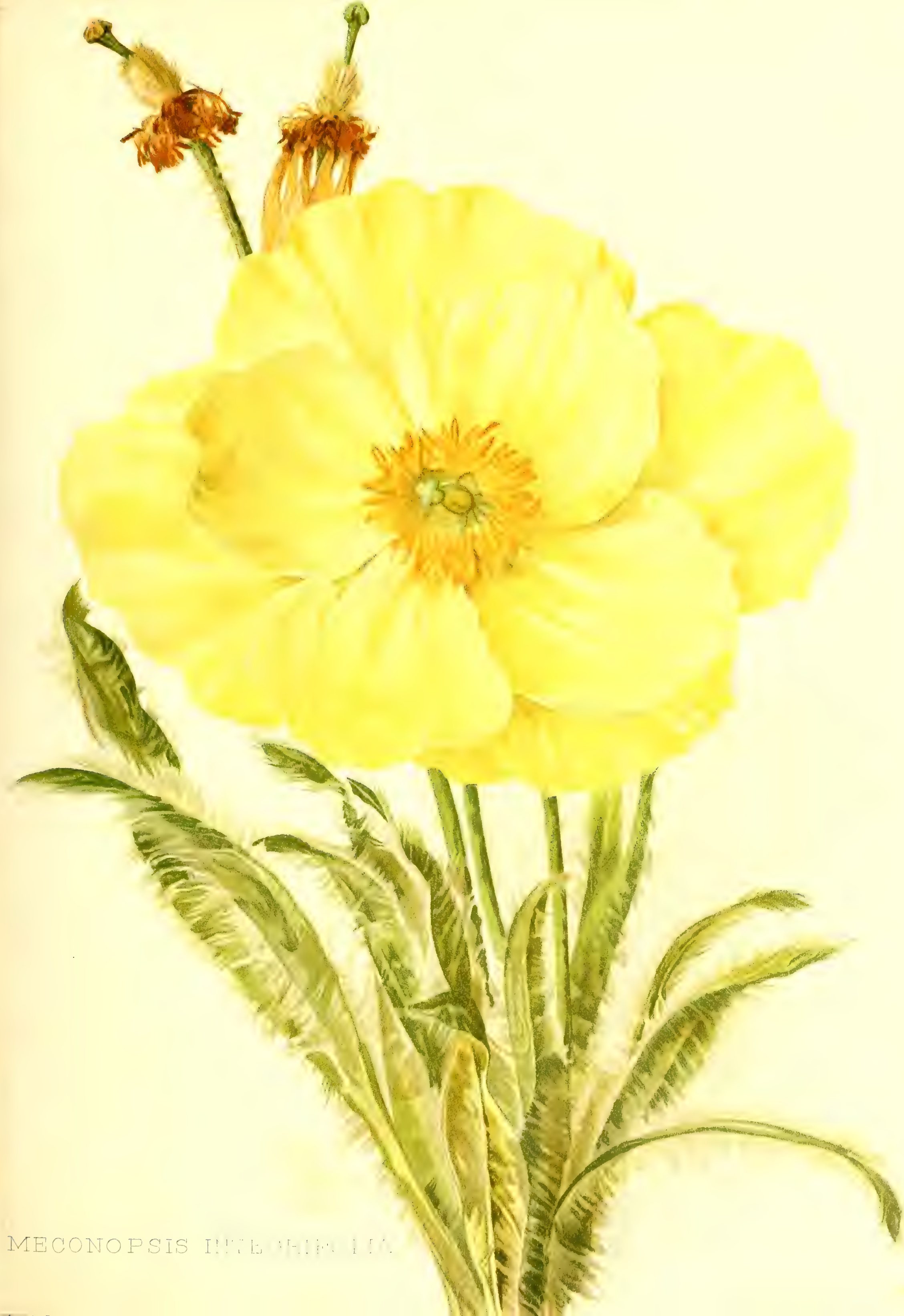
* Drawn by Miss M. Wroe from a plant in Messrs A. Bee & Co.'s nursery at Neston.



MECONOPSIS INTEGRIFOLIA

Of *M. bella* it is enough to say, that the few who have been privileged to see it on the wet rocks of Sikkim, reckon it quite unsurpassed among flowering plants, and that up to date no one—unless by good fortune exception be made for Dr Balfour at Edinburgh—has succeeded in getting it past the seedling stage. Even the Californian *M. heterophylla* shares the family frailty. Of annual duration, it grows rapidly into a top-heavy little bush, and any wind stronger than a zephyr has little difficulty in snapping it off at the collar. It is too early yet to say anything of value as to *M. racemosus* and *M. puniceus*, save that the first named has begun to seed satisfactorily.

There remains the Welsh Poppy, our native *N. cambrica*. Here at last all frailty disappears. A strong and vigorous perennial, regardless of wind and weather, *M. cambrica* is a true poor man's plant. But in addition to these merits it yields a long succession of flowers which are not surpassed in delicate beauty by any member of the family. It was the writer's good fortune to come, last July, upon a large colony of the Welsh Poppy in a remote alpine solitude, where its effect was as indescribable as Nature's careless effects generally are. But it gave a valuable hint as to the way in which this fine wildling might be used in the damp, rocky ground which is its chosen habitat. Lately the plant has shown signs of breaking, and has produced offspring with orange and with double flowers. Here is a chance for an amateur with the necessary time to spare. Let him give us a race of Welsh Poppies covering all the pure and splendid colours which the Poppy so loves to wear. The results might be even more valuable than those now being got from *Papaver orientale*. ARTHUR K. BULLEY.

Species.

Fuller knowledge of the plants of Central Asia has increased the Meconopsis group to nearly a score of kinds, of which all save two are from the high mountains of that region, the exceptions being *M. cambrica* in Europe and *M. heterophylla* in America. Few plants are better worth a place in the flower-garden and most of the kinds are hardy in our climate, but so far they are not among the most easily grown, the stagnant moisture of our winters rather than their cold, being against them. And yet they are all water-loving plants, seen at their best in moist summers, and soon crippled in times of drought. To preserve them from excessive damp in winter, many growers place a layer of broken sandstone round those that keep their leaves, and slanting panes of glass are also used to ward off heavy rain. At the same time one of their most charming effects is that of the gleaming raindrops standing on the hairy leaves after a shower. They do best in well-drained parts of the rock-garden, in deep, gritty soil, and sheltered from hot sun, especially in the south of England. A mixture of peat and loam suits the taller kinds well, and they may be grouped in such soil along with the Himalayan Primulas, or other plants such as the large-flowered Mimulus, which help to keep the surface cool and moist. As with all the Poppy tribe, it is important to sow the seeds as early as possible, for even good seed soon loses its vitality. Sowings should be made every year in pans, growing the young plants on without a check, exposing them gradually as they gain strength, and getting as much growth as possible into the first summer. Potted into four-inch pots, in a mixture of peat and loam, they can be planted out 18 inches apart in spring, without feeling the change. When older, they move with large balls of earth, held by the fibrous roots, and may then be grouped where they are to flower; the strongest plants bloom in their second summer, and those less forward remain as a reserve, but long waiting in pots is against success. According to vigour and season the plants vary in height, and the effect of different kinds is very different, such as *paniculata*, *nepalensis*, and *Wallichi* forming tall pyramids of flower, while kinds like *simplicifolia*, *horridula*, and *punicea*, give only one bloom to each stem. The flowers of most kinds are too fleeting for cutting, but those of *cambrica* and *heterophylla* are useful in this way. The following species are now recognised but are not all in cultivation.

Meconopsis aculeata.—One of the most stately and beautiful of plants, forming a pyramid of branching stems, with leaves of pale green deeply cut into irregular lobes, and covered all over with soft tawny-coloured bristles. It is a biennial, hardy in our winters, though less beautiful through the loss of its leaves, which die away to a bare crown. It flowers in June upon stout stems 2½ to 4 feet high, bearing many flowers 2 to 3 inches across, of a lovely deep blue shaded with violet, the petals glistening like shot silk, and contrasting charmingly with the yellow stamens. Western Himalayas, at elevations of 11,000 to 15,000 feet.

M. bella.—From the high mountains of Sikkim, where it grows under conditions which seem to make success difficult in Britain. Its noble solitary flowers of blue or bluish-purple, are borne in a high region of cloud and mist, which is yet free from rain, to which the plant seems averse. It finds its foothold in crevices nearly destitute of soil, thinly surfaced with rocky fragments and damp moss, and beneath this covering its roots spread far, throwing low tufts of much-cut foliage. Whether a true perennial, or only biennial, is still uncertain.

M. cambrica.—Welsh Poppy. A native plant, and one of the best for stony banks, old quarries, or bare shady places. The only trouble is to keep it from smothering more delicate neighbours in gardens; to keep it in check and to prolong its beauty, the seedpods are best cut off as they form, for it will spread anywhere, even upon gravel walks and tiled courtyards. For old walls it is quite at home with Wallflowers, and the Yellow Corydalis, giving a long succession of flowers from May to August. Its cheerful yellow flowers are borne upon long stems and continuously through the summer. Left to spread in moist places where its free growth can do no harm, there are few prettier pictures than a colony of the Welsh Poppy, seeds of which may be sown in the open during April. Of recent years a strain of double flowers has arisen, giving shades of yellow, orange, and red.

M. chelidoniifolia.—A little plant of dwarf habit and deeply cut foliage, from the Thibetan frontier of China. Not, as yet, in cultivation.

M. grandis.—A scarce and newly introduced kind from the mountains of Sikkim, and one of the few true perennials in the genus. This is fortunate, for though it has flowered under glass with Mr Bulley for two years in succession, it has yielded no seed. It is a plant of tall habit, with uncut leaves and solitary purple flowers of beautiful glossy texture.

M. heterophylla.—The only kind found in America, where it grows over a wide area but is nowhere abundant, thriving best in the light, dry soils of California. It is an annual, and succeeds in this country both as a pot-plant under glass, or in the border during summer, where it flowers and ripens seed freely. It is a variable plant, but mostly reaches 12 to 18 inches in height, with pale green leaves, deeply cut, and hairy. The flowers, upon long slender stems, are red, copper-coloured, or orange, with a deep maroon blotch in the centre, and a scent of Lily of the Valley. They are more lasting than in other kinds, and useful for cutting, coming in June from seed sown in heat early in the year or in the open a little later. Syn. *M. crassifolia*.

M. horridula.—A little plant found at a great height in the Himalayas, growing as almost stemless tufts of lanceolate leaves, covered densely with prickles; the short unbranched stems bear solitary bluish-purple flowers about an inch and a half wide.

M. integrifolia.—A new kind flowered in this country for the first time this year, its large pale yellow flowers (shown in our plate) being much admired. The plant grows at a height of 11,000 feet to 15,500 feet in the mountains of Thibet and S.W. China, where myriads of plants are to be seen bearing flowers which sometimes measure 10 inches across. In the size and number of their flowers, however, the plants vary, some being only 3 inches wide, while from 3 to as many as 15 perfect blooms may be open at once. Nor is there any regularity in the size and number of petals, for though mostly 5 in number, there are often more. The plant is a biennial, hardy, and with oval uncut leaves of pale green, about a foot long when fully grown, and more or less covered with soft, silky hairs. The stems vary in height, but the plants flowered in this country were from 12 to 18 inches high, flowering until the first keen frosts. Like all the Meconopsids, *integrifolia* is a moisture loving plant, thriving in peat or leafy soil in a half shady place.

M. nepalensis.—At one time the best-known of these Indian Poppyworts, this kind is now less often seen, spite of its hardiness and fine leaves, which are themselves enough to make it worth growing. These come in tufts a foot or more across and containing as many as 50 to 80 leaves of pale yellow-green colour and soft woolly texture, from the long yellowish hairs with which they are thickly covered. The lower leaves lie on the ground as a dense rosette, with the younger ones erect or nearly so, and as they remain in a good state throughout the winter, a group in the rock-garden is welcome, especially when the long hairs are set with silvery drops after rain. The flowers come in June of the second year, upon thinly branched stems of 2 to 5 feet. The flowers open in succession beginning from the top of the spike, and are of pale sulphur yellow, 2 to 3 inches across, and of thin texture; our sun seems too weak to develop the bright colour of which travellers tell us in its own country. Though the plants die after flowering, seeds generally ripen from the early flowers, and should be sown at once in a moist, shaded border of light loam or peat, even small seedlings being quite hardy in most winters; when happily placed, the plant will sometimes sow itself. Planted in deep sandy peat, and a moist and well-drained spot in partial shade, the young plants grow freely. Nepaul. There is

MECONOPSIS WALLICHI.

a fine form bearing large bell-shaped flowers of ivory-white, but this is rare.

M. paniculata.—A beautiful Himalayan plant with much-cut foliage and panicles of bright yellow flowers, which come true from the seed ripened sparingly in fine seasons.

M. principis.—A plant first found by Franchet in Thibet; it comes near *M. punicea* but is not so large a plant, and its smaller crimson flowers are held erect instead of nodding.

M. punicea.—A fine kind newly introduced through Messrs Veitch's collector in China, and flowered in their nursery during September of last year. It comes near *integrifolia*, and is found growing with it at a great height in the mountains of Thibet. The leaves are entire, tapering at both ends, and covered with long coarse hairs of a shining yellow colour. The massive flowers are borne singly upon slender stems of 1½ to 2 feet, reaching at their best 6 inches wide, and composed of large drooping petals of carmine-red or reddish-purple. Even the wild flowers show a tendency to become double, which will doubtless increase under cultivation. The plants grow in moist meadows among grass and low shrubs, which shield from direct sunlight.

M. quintuplinervia.—A perennial kind from Manchuria and N. W. China, of dwarf growth as a rosette of long-stemmed uncut leaves, covered with reddish hairs and traversed by five prominent veins, to which the plant owes its name. The nodding flowers come during summer upon hairy stems of 6 to 12 inches, and are cup-shaped, 1½ inches wide, and pale violet or purple with a large cluster of golden stamens.

M. racemosa.—A rare plant but lately introduced to this country. Its flowers range in colour from pale lilac to deep purple, and have given good seed in the past autumn. China.

M. simplicifolia.—A plant beautiful in leaf and flower. The leaves are 4 to 6 inches long, lance-shaped, quite entire or slightly cut, and thickly covered with short, brown hairs. The flowers come in early June upon unbranched stems of 1½ to 3 feet, bearing at the summit one large half-drooping flower, 3 inches across, of deep rich blue petals, shaded towards the edges with rosy-purple, and guarding a crown of golden stamens. Though few in number, these flowers are more lasting than in other kinds. The plant is a hardy biennial, dying to the ground in winter, and doing best in moist, gritty soil and partial shade.

M. Wallichi.—The best of the group, beautiful at all seasons, and hardy, though the plants sometimes perish in times of heavy snow from the damp soaking into the crushed leaves. The leaf-tufts are fully as handsome as in *nepalensis*, larger, and deeply cut, forming rosettes of grey-green, 2 to 3 feet across, and covered with soft orange or reddish-brown hairs. The leafy stems appear during the summer and are 3 to 7 feet high, rising in a stately pyramid covered with buds, which begin to open from the top, downwards. The flowers are 3 inches across and bright pale blue in the best forms, with a central cluster of yellow stamens and the petals prettily drooping. Though the individual flowers are short-lived they are renewed so freely each day as to last more than a month in beauty, bearing buds upon side-shoots all down the stem for fully two-thirds of its length. The plants die after flowering, and though early flowers yield seed, a large proportion of the seedlings often turn out as shades of dingy purple and brown, and these forms, known as *purpurea* and *fusco-purpurea*, are disappointing. Even in imported seed these bad colours are present, but their proportion is larger in home saved seeds. The seed may be sown when ripe in a cool shaded frame, or in March in a little heat, and the strongest plants will flower about August of the second year; though many do not bloom until the third or fourth season, their foliage is so handsome that this is no loss. They do best in well-drained peaty soil, sheltered from wind, and shaded from hot sun. In the open they are apt to flag and lose colour on warm days, whereas the half-light even of twilight, shows the delicate flowers to fine effect. At Kew and other places this kind is well grown in the light shade of Bamboos, and if not too near the hungry roots, this is a good place. Mountains of Sikkim, at elevations of 12,000 to 14,000 feet.

Though two or three other species are known to botanists, they are not in cultivation. Among these is *M. superba*, a noble plant from the Chinese frontier; and *M. robusta* of the central Himalayas, a plant of 4 to 6 feet high, covered with very long soft hairs. B.

THE LIQUIDAMBAR.

The Liquidambar is a tree of large size, where it finds congenial soil and a mild climate. In the woods of some of our Southern States, and especially in low, moist ground near the coast, it attains its maximum height of 150 feet, and when well grown is an imposing object, distinct and beautiful in every part.

Liquidambar belongs to the Witch-Hazel family, which includes our common Witch-Hazel, and our native shrub, *Fothergilla carolina*. It is a pleasant tree to live with, attractive at all seasons. When the young leaves unfold in the spring they perfume the air, and under our warm sun the tree distils a fragrant gum which druggists call *copal-balsam*, and use as a substitute for storax. The leaves of the Liquidambar or Sweet Gum, as it is often called, are simple, broader than long, deeply cleft, 3 to 9 inches wide, smooth above, and downy in the axils of the veins beneath. These somewhat star-shaped leaves are a deep dark green, and glossy, with a freshness which they retain throughout the heat of summer if the tree is planted in moist ground, or where the roots have access to running water. If planted on dry ground the tree does not thrive, though it may cling to life. We have one here planted ten years ago on a dry hillside and in poor soil, which frequently dies to the ground, but retains root vitality and tries again every spring, as if hoping for better things. Another young tree planted at the same time in a hollow where the soil is rich and moist, is growing well and now about 12 feet in height.

All of our American writers on native trees unite in praise of the Liquidambar. It used to be (and perhaps still is) a good deal planted in England. Downing, who wrote about it many years ago, was, I think, instrumental in bringing it to the notice of English planters. He says: "We hardly know a more beautiful tree than the Liquidambar in every stage of its growth, and during every season of the year. Its outline is not only picturesque or graceful, but simply beautiful. . . . It is a highly-pleasing, round-headed, or tapering tree, which unites and harmonises well with others, but its chief beauty lies in the foliage. During the whole of the summer it preserves, unsoiled, that dark, glossy freshness which is so delightful to the eye; while the regularly palmate form of the leaves distinguishes it at once from the common trees of a plantation. But in autumn it assumes its gayest livery, and is decked in colours almost too bright and vivid for foliage, forming one of the most brilliant objects in American scenery at that season. The prevailing tint of the foliage is then a deep, purplish red, unlike any symptom of decay, and quite as rich a colour as that commonly

seen in the darker blossoms of a Dutch parterre. This is sometimes varied by a deeper or lighter shade, with sometimes an orange tint. When planted in the neighbourhood of our fine Maples, Ashes, and other trees remarkable for their autumnal colour, the effect in a warm, dry autumn is almost magical." It does not always turn a deep, purplish red; indeed, I have usually found it particoloured, the deep red mingled with tones of bronze, green, and orange. It varies much also in different seasons, for sometimes the foliage shrivels and assumes dull shades of brown and yellow; this was its character last fall—an unusually dry season. The light grey bark forms corky ridges on the trunks of small trees, and on the branches of larger ones, and by this rugged appearance the tree may easily be distinguished in winter. It should be planted when small, and given a sheltered place in deep and moist soil. It ought to do well in the climate of the south of England, for it will not attain full size and beauty under uncongenial skies. In our Northern States, though it lives it will not yield its fragrance, nor its resin as under the warm southern sky.

The wood of the Sweet gum is hard, and reddish, but I do not know of its being put to any useful purpose, though it will preserve woollens from the attacks of moths. The tree is not injured by insects, owing, perhaps, to the strongly aromatic property of the leaves. Mr. Robert Ridgway speaks of a Sweet Gum on the banks of the White River in Tennessee, as being 160 feet high; as usually seen, however, it is of medium height, erect, and of rather slender growth. It grows rapidly in good soil, with branches short in comparison with its height, making a pyramidal head. Its range is from Connecticut to Florida, and west to Texas, attaining its greatest size in the Mississippi Valley. Although a beautiful tree, it is not well known to American planters, and perhaps rarer in cultivation here than in England. The flowers of the Sweet Gum appear in small heads, and are greenish-yellow and inconspicuous, the sexes being apart but upon the same tree. In moist, warm soils it should be freely planted for its beauty, and especially for its fine autumn colour. DANSKE DANDRIDGE.

Shepherdstown, Jefferson County,
West Virginia.

Our American correspondent does well to notice this handsome and neglected tree, seen too rarely in our valley gardens and richly beautiful last season in its autumn colour. We append a few notes for the sake of intending planters, though the best season for moving the Liquidambar is already past, being quite early in October, even before the leaves have dropped. An old planter of wide experience finds this the best time of all, and far before spring-planting; only young trees can be moved with success, and these should be cut back if the roots are much injured. The tree is hardy in England and the south-west of Scotland, but its young shoots are often touched by frost from the Tweed northwards. Being of brittle wood, shelter should be found from rough winds, with as much sunlight as possible if fine colour is desired in autumn; even with all the sun possible, in a wet season the leaves turn only a dull purple, a shady place having the same effect. In our climate the finest colour is often seen upon the small trees growing in lighter soils than those necessary to its finest development, and in this matter it has to be something of a compromise between rapid and luxuriant growth and fine colour, the large trees found in damp places rarely giving the vivid tones of crimson and orange seen in stunted trees upon drier ground. The leaves hang longer than in most cases of rich colour, and, as with the Sumachs, quite little trees give bright effect. Of dense shade and vivid green, its beauty in the deep alluvial soils of our river valleys can hardly be over-praised. Its star-like leaves, often 7 or 8 inches across, are almost Maple-like in the early stages though the tree is easily recognised by its erect-branching habit and the queer fin-like ridges of grey corky bark—often an inch thick—upon the branches. The leaves, slightly fragrant at all times, give off a pleasant herb-like smell when crushed, and the bruised bark yields a clear yellow juice hardening as a fragrant amber-like gum to which the tree owes its names. In notes upon this tree given by an old book upon the natural history of Carolina this gum is said to have been chewed by the Indians for its good effect upon the teeth; hence the common name of Sweet Gum. The large old trees were frequently stripped of their bark—used to roof the native huts—and the wounded trees yielded quantities of juice. Though of fine texture and handsome for wainscots, the timber is only good after long seasoning. The Liquidambar is not easily increased except by layers or suckers from the root; neither of these being good ways. Imported seed is often a year or more in germinating but the best plants are raised in that way. Only one other species of Liquidambar is in cultivation and that not often seen outside collections. It is the Oriental Liquidambar (*L. imberbe*), a little tree of slow growth with a much-branched head of rounded outline, more bush-like but similar in other respects to the American kind. Seldom more than 20 feet high, it might often be mistaken for a form of the Field Maple when standing alone upon a lawn. Its leaves are rather more deeply cut and without hairs in the axils of the leaf veins; the tree also is found hardier than *styraciflua* on the mainland of Europe. It comes from the shores of the Levant, extending thence into the mountains, and its hardened gum was formerly esteemed in medicine.

EUPATORIUM MICRANTHUM.—This Mexican shrub, under its better-known name of *E. Weinmannianum*, is fairly common in the south-west, and very valuable for its late flowers. I see it stated in the article on Eupatoriums (p. 26), that, "it is sometimes grown very prettily as a wall shrub in the open air in the south-west of England," but all the specimens I know are grown in bush form in the open borders, with no wall near them. They form rounded shrubs, one of the finest I am acquainted with being 8 feet in height and as much through. In September *Escallonia floribunda*, or *montevidensis*, produces its white pyramids of flower, which are haunted by countless butterflies. In the following month, when its blossoms have faded, *Eupatorium micranthum* begins, and by the close of the month is covered from its topmost spray to the ground with its flat, white, fragrant flower-heads, to which the remaining butterflies flock. It holds its flowers through the greater part of November, and in December a fair sprinkling is still to be seen. Now, in January, grey, fluffy seed-vessels, which are not unattractive, take the place of flowers.—S. W. FITZHERBERT.

THE WITCH HAZELS (*Hamamelis*).—This comes to us as a fine bold branch covered with spangles of gold, from Messrs Cripps of the Nurseries, Tunbridge Wells,—a curiously interesting winter-flowering bush. Coming so well at this time of the year in the southern country, the Witch Hazels are not only good for out-door gardens but also for the house. Cutting bold branches for the house saves the flowers from the vicissitudes of the open air. There are several hardy kinds :—The Tree Witch Hazel (*H. arborea*), often considered the best ; the Japan Witch Hazel (*H. japonica*) and its variety *zuccariniana*, of dwarfer habit and less bright in colour ; and the new Hairy Witch Hazel (*H. mollis*), well shown at a recent meeting of the Royal Horticultural Society, and very distinct with its paler bark, stouter and more rigid stems which are but little branched, and flowers in which the petals are so much broader and less curled as to gain in beauty, even in the small plants shown. The old *Hamamelis virginica* blooms in the autumn when its small yellow flowers are in a great measure hidden and ineffective.

SHORTIA UNIFLORA.—To the Editor of FLORA: Sir, In reference to the brief mention of *Shortia uniflora* in the notes accompanying the coloured plate of *S. galacifolia* on page 9 of your January issue, I must dissent from the author's remarks that *S. uniflora* is "so near the American kind as hardly to be distinguishable from it," and that its flowers "are a little smaller" than those of *S. galacifolia*. On the contrary, the mature plants are quite distinct, and the flowers of the Japanese form are the larger of the two. As an example of this I find the blooms in your illustration do not exceed an inch, whereas most of the 27 flowers on one of my plants of *S. uniflora* last season measured 1¾ inches in diameter. I refrain at present from going into further details, as a photo of this plant (taken in 1902) and my recent notes thereon, will be found in Vol. XXIX. of the *Journal of the R.H.S.*, but during the last three years it has much increased in size and vigour, and I am glad to say is promising well for this spring's blooming.—Yours faithfully, W. T. HINDMARSH, "Alnbank," Alnwick. [We hope shortly to publish a drawing of this fine plant of *Shortia uniflora*, with notes upon it by our correspondent.]

SONGS OF THE WOODS AND FLOWERS : A DOWN GARDEN.

There lies a little garden
High on the Sussex downs,
Far from the haunts of fashion,
Far from the noise of towns.

The sea-birds soar above it,
The rabbit stays to peep,
And slowly round it saunter
The shepherd and his sheep.

No tree shuts out the sunshine,
No fence withholds the wind ;
Soft turf affords the shelter
The chosen flowers find.

Safe in their grassy corners,
Rejoicing with the sun,
Narcissus, Tulip, Iris,
Stand glorious one by one.

And oft their beauty calls me
To throw the tools away,
And share in sunlit silence
Their unmolested day.

EDITH C. M. BOODLE.

FLORA
AND SYLVA.

Vol. III. No. 25.] APRIL, 1905 [Monthly.

QUALITY IN VEGETABLES.

In view of the importance and value of the quantities of vegetables now grown in Britain and western Europe, and the ceaseless flow of novelties, little care is bestowed on what should be the main thing—flavour and quality. The desire for new things is such that the trade will supply them at all costs, and the pity is that when things vary so much in quality as many of these do, we do not insist on the best only. This subject is brought to our mind by Mr. Scarlett, an Edinburgh grower, who sends us some kinds of Potato which he claims are of good flavour, and on trial we find to be really free from the bitter taste so often found in Potatoes, the raisers, generally speaking, looking first to other qualities. Observers of such things must have noticed how ill-flavoured and bitter many Potatoes are, this being a reversion to their wild mother, one of a poisonous family. With such an origin there is all the greater need to get as far away as we can from these objectionable qualities, and with our immense choice of kinds it ought not to be difficult to do so. Potatoes come to our markets occasionally from the sandy soils of North Germany and Belgium which would not have a chance on our show benches, but, like a yellow kind grown near Bruges by Mr. Sander they are of excellent flavour.

Other vegetables, like the Celery, belong to families that are poisonous, and it is of importance to get them away from that character, which in the case of Celery is partly done by blanching, but might very well be improved upon by further selection. As to the Carrot, English cooking is disgraced by coarse Carrots which are only fit for cattle food, whereas we have the choice of small and delicate varieties. In the Turnip perhaps we seek too much in the direction of richly-flavoured kinds, the most delicate Turnips being the long ones of the Paris market, which retain some of their wild and pleasant flavour.

The wild Cabbage is a most acrid plant and the parent of almost countless varieties grown in all civilised countries, and here, if anywhere, there is need of selection as regards delicate flavour. It may not be easy to influence the seed trade, which, like many others, is bound by routine ; but private growers may help by rejecting vegetables of bad or poor flavour, and especially all novelties deficient as to quality. Certain varieties of the Cucumber have occasionally a bitter flavour, and as the plant belongs to a family some of which are poisonous, it is worth an effort to get rid of varieties that have this defect. The true Artichoke is usually grown in this country without thought as to variety, though there are distinct varieties of it and some of the good French ones should be grown true to name. The common Bean is an illustration of wrong effort in the raising of huge varieties, the flavour of the common Field Bean being better than that of any other. Among Peas there is a real improvement, English varieties being excellent in flavour during recent years. Among Beetroots the turnip-shape is the best for flavour, and, in view of the tendency of this plant to vary, there is room for improvement in this direction.

Getting rid of natural flavours is not always a gain but sometimes the contrary, as in the case of the Chicory, which comes to us from Belgium with its wholesome and natural bitter flavour. Even the Onion, with its strong flavour, may be improved, and some of the quickly-grown large kinds of recent years are a distinct gain in this way.

Also, all should work against the spoiling of some vegetables through the misguided effort for size. Although the flavour of vegetables may be less marked than that of fruit, it is often their essential quality. A change in size, by adding to the watery and fibrous tissue of a plant, may weaken the flavour, as has been done in the case of the Brussels Sprout, which is no longer the same little rosette of green, but a coarse Cabbage-sprout. For some years there has been in our markets a very large French Bean, without any of the quality of the small kinds, though its huge pod makes it popular with the market-gardener, whereas the French Bean ought to be a delicate vegetable the value of which should depend entirely upon its flavour.

The cooking of vegetables to form dishes for their own sakes—as is done in France and other continental countries—might also be encouraged. If fruits, cereals, and roots are worth this care, far more should be the fresh green vegetables which our moist climate enable to thrive longer without artificial watering than perhaps any other. Among the vegetables which are treated in this way by the French cook, are Cardoons, Celery, Celeriac, the Artichoke (both true, and false), Kidney Beans, Indian Corn, Marrows and other Gourds, Egg Plant, Batavian Endive, etc. The methods of steaming and braizing which preserve the natural juices of vegetables, instead of throwing them into (often) hard water, makes this all the more desirable and indeed necessary, if we are to enjoy the full benefit of the many excellent vegetables now within our reach.

* * *

It is neither wise, nor tender, nor loving, to remit to others, however expert, the supreme care of one's garden. You will tend yours with your own hands, and discover its needs with your own heart; and if, in doing so, you have to withdraw yourselves sometimes, more than accords with modern wont, into rural seclusion, your social instincts will not thereby be starved, nor your share in the graces and charities of life thereby be curtailed. You will find much resemblance between flowers and human beings, for they too grow reserved under coldness or maltreatment, and respond with almost feminine alacrity to every sympathetic endeavour to apprehend them.—Alfred Austin.

BRASSAVOLA.

Brassavola was founded by Robert Brown in 1813, its name being in compliment to Dr. Brassavola, a Venetian botanist, and the first kind, *Brassavola cucullata*, brought by Rear-Admiral Bligh from the West Indies in 1793. The group may now be divided into two classes, that grouped around *Brassavola nodosa* being the larger. The plants of this class vary a good deal, the oldest kind, *Brassavola cucullata*, being distinct from any other, while *Brassavola acaulis* has also marked differences in its long, pendulous, fleshy leaves and larger flowers, more like the flowers of *B. glauca* of the second class, than any of the others. The common features of this group consist in short and woody stems, bearing more or less rounded, fleshy, and channelled leaves, which are generally decurved or drooping, and with the flowers borne at their bases after the manner of an Epidendrum. The flowers have usually nearly equal, lanceolate-acuminate sepals and petals, for the most part of a greenish-white colour ; and a broad white lip.

The second, or large-flowered section, to which the fringed *Brassavola Digbyana* belongs, contains only that species and *Brassavola glauca*. These plants so differ from the first group that the late Prof. Reichenbach removed them to Lælia, thereby setting up a serious botanical blunder which was continued by Bentham in the *Journal of the Linnean Society*, 1880, p. 314. Apart from their larger flowers and more erect Lælia-like growth, there was no reason for this removal from Brassavola, with which they otherwise perfectly agree, even to the elongated beak of the ovary. This peculiar feature is remarkably developed in *Brassavola Digbyana*, the two-inch-long seed-bearing base being drawn out into a slender beak, 5 or 6 inches long in the mature fruit. In both sections the flowers have a strong odour of the Tuberose, and the same white and greenish-white colour, scarcely another tint being found save a tinge of rose on the outside of the sepals in some kinds, and slight markings of purple at the base of the lip in others.

Culture. All the Brassavolas thrive in an intermediate house, such as that used for Cattleyas and Lælias. They prefer teak-wood baskets, but may also be grown in pots or on rafts. As a compost, fibrous peat and sphagnum moss will be found the best and safest. A copious supply of rain-water at the roots should be given while the plants are in active growth, with a much less quantity when the growths are matured ; for although evergreen, this ripening of the plants is necessary. Full sunshine is commonly advised for these plants, but, as with other Orchids, such as *Lælia anceps*, which grow in sunny places in their own land, it is better to secure a good diffused light by a little shading during the growing season, to be followed by full sunlight as the growths are approaching maturity.

Distribution. These Orchids are widely distributed throughout Mexico, Central America, Brazil, and the West Indies. Some kinds have also a very wide range and much variation in habit of growth and size of flower. In this way varieties of one kind have frequently been named over again, and a confusing list of synonyms set up. The many published names can therefore be reduced to a much smaller number of distinct kinds, and the group might be further simplified were the material available for complete revision. The following species are known in gardens :—

Brassavola acaulis. — Leaves fleshy and drooping. Sepals and petals greenish-white. Lip large and cordate, white, with small purple markings at the base. A variety known as *lineata*, is a strong-growing form from Central America, with fine flowers. Syn. *B. Mathienana.*

B. Ceboletta.—One of the smaller species, allied to *B. Perrinii.* Brazil.

B. cordata.—A pretty kind with greenish sepals and petals, and a broad, cordate, white lip. West Indies.

B. cucullata. — Habit drooping. Leaves fleshy and rounded. Flowers with narrow segments extending 3 or 4 inches. Sepals and petals usually greenish-white though sometimes white, with a white lip expanded at the base, which is fringed and continued into a long narrow blade, in front. Mexico and West Indies. Syns. *B. cuspidata*, and *B. odoratissima.*

B. Digbyana.—Flowers the largest of the genus. Sepals and petals mostly pale greenish-white, sometimes tinged with purple at the back. Lip expanded and deeply fringed, creamy-white with a pale greenish disk. Flowers fragrant. Plant erect, with compressed pseudo-bulbs bearing thick, rigid, glaucous leaves, 6 or 8 inches long. Honduras.

B. glauca.—Similar in habit to *B. Digbyana*, but more dwarf and tufted. Flowers 3 to 4 inches across, and fragrant. Sepals and petals greenish ; lip white, cordate, folded over the column at the base, and bearing often a small purplish blotch at the mouth of the tube. Mexico and Guatemala.

B. nodosa.—One of the best known kinds and a free-growing plant, with rather erect, fleshy, channelled leaves, and upright spikes of flowers, which have yellowish-white sepals and petals, and white lips. Syn. *B. venosa.* A larger form with showy flowers, known as *grandiflora*, is widely distributed in South America, and is also found in Jamaica.

B. Perrinii.—A well-known plant with greenish sepals and petals, and a white lip. Brazil.

B. tuberculata.—This is also one of those best known in gardens. It differs from the others in having the sepals of its flowers more or less spotted with purple. Lip white. Syns. *B. fragrans*, and *B. Gibbsiana.* Brazil.

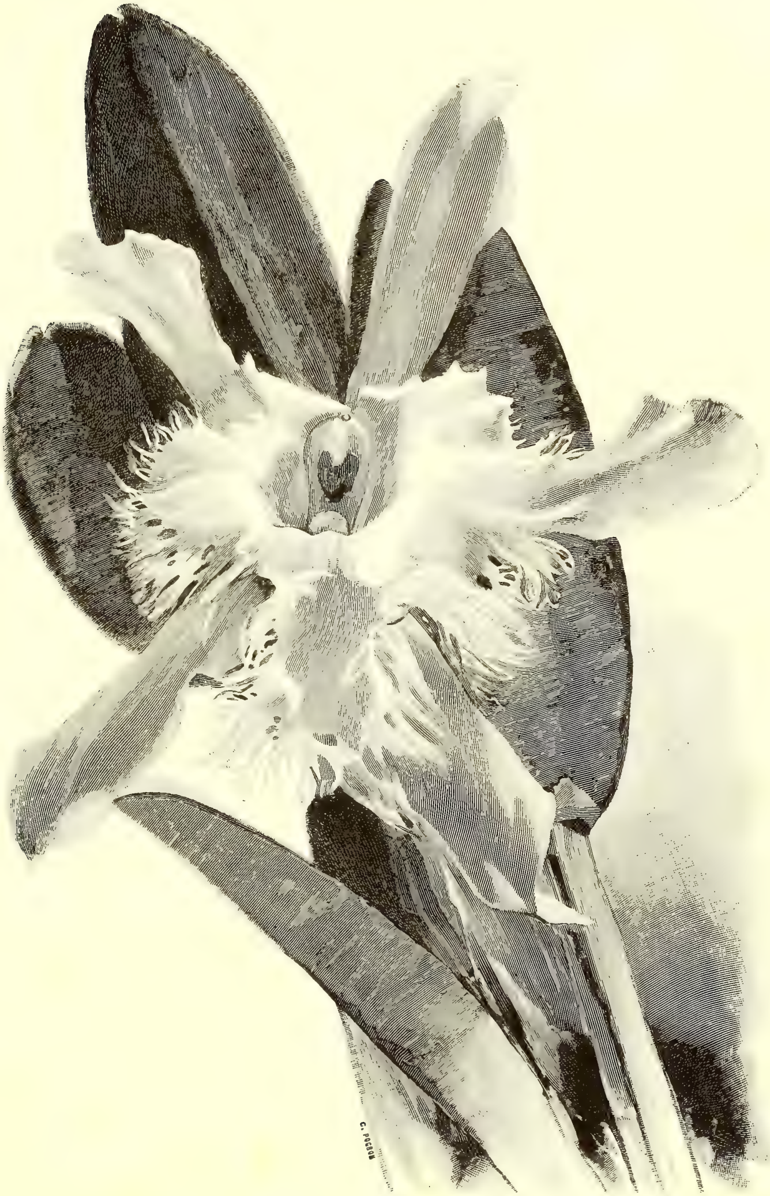
Less important species are *B. angustata*, *B. filifolia*, *B. flagellaris*, *B. Pumilio*, *B. retusa*, *B. revoluta*, *B. subulifolia*, and *B. vomeriformis.*

Hybrids.

The raisers of garden hybrids have turned their attention mostly to *B. Digbyana.* This has been found to cross very freely with Cattleyas and Lælias when used as the pollen parent, but although many raisers have tried to get good results from it as a seed-bearer, and some have claimed success, no such plant has ever yet flowered. At p. 265 of Vol. II. of FLORA AND SYLVA, in an article accompanying a coloured plate of *Brassocattleya* × *Imperatrice de Russie*, is a full list of the showier hybrid forms of *Brassavola Digbyana* but given as hybrids of *Lælio-Digbyana*, and styled Lælio-Cattleyas. There remains therefore but to change Lælia for Brassavola, and Lælio-Cattleya for Brassocattleya, and the list stands good.

The following should however be added to it :—*Brassocattleya* × *Digbyano-Mossiæ* "*Queen Alexandra*," the first pure white form of crosses with the large-flowered Cattleyas, and the result of crossing the albino *C. Mossiæ Wageneri; Brassocattleya* × *Digbyano-Mossiæ*, Westonbirt variety, the finest dark rose form ; *Brassocattleya* × *Digbyano-Warneri* "*Eric Lucas*," also a brightly coloured flower ; and *Brassocattleya* × *Digbyano-Schroderæ alba*, a blush-white variety, with primrose-yellow disc to the lip.

In the round-leaved section of the genus the first hybrid to appear was a natural cross, *Brassocattleya* × *Lindleyana* (*B. tuberculata* ×



Brassavola Digbyana. *Engraved for "Flora" from a drawing by H. G. Moon.*

Cattleya intermedia) a plant which, until recently, was referred to Cattleya and Lælia. It was brought from Brazil in 1857 and has recently been nearly reproduced in gardens in *Brassocattleya* × *nivalis* (*B. fragrans*, or possibly *tuberculata* × *Cattleya intermedia*). Both plants have the same habit of growth and form of flower, but in the natural hybrid the broad concave lobe of the lip is white tinged and spotted with purple, whereas in *nivalis* the purple colouring is absent.

Brassocattleya × *striata* is a home-raised hybrid between *Cattleya Mossiæ* and *Brassavola fragrans* (*? tuberculata*), with showy, expanded, rose-veined lip.

Brassocattleya × *Belairensis* (*B. Perrinii* × *Cattleya guttata*) is a continental hybrid, with prettily formed flowers of rather thick substance.

Brassocatlælia × *Mackayi* (*Lælio-Cattleya* × *elegans* × *Brassavola Digbyana*) is a pretty hybrid with blush-pink flowers, the fringed lip being rosy-pink colour.

Brassocatlælia × *Lindleyano-elegans* is the result of crossing *Brassocattleya* × *Lindleyana* and *Læliocattleya* × *elegans*.

Brassocattleya × *Orpheus* (*B. glauca* × *C. Trianæi alba*) is a very pretty white hybrid with fragrant flowers, first bloomed in January 1902.

Brassocattleya × *Sanderi* (*B. glauca* × *C. Schroderæ*) flowers similar to those of *Orpheus*.

JAMES O'BRIEN.

Harrow-on-the-Hill.

A WINTER-BLOOMING TREE (*Prunus Davidiana alba*).—Mr Waterer sends us beautiful sprays of this in mid February, sprays which surprise us by their extraordinary beauty, every twig being laden with pure-white flowers or pearl-like buds. It is seldom that a white form is prettier than the usual form of a tree, but in this case we may almost claim that it is so. As in nine out of ten winters we may hope that the weather will be favourable enough to allow this tree to bloom over a large range of our country, it will be seen what a very important hardy tree it is, and how it lends itself to fine effect in the open. It is also one of those things that serve so well for cutting for the house before it opens naturally, thus prolonging its bloom-time.

NEWER WILD TULIPS.*

UPON the opening up of Central Asia by the Russians, some thirty years ago, quite a large number of new Tulips were introduced into our gardens. Of these such noble species as *Tulipa Greigi*, *Kaufmanniana*, *Ostrowskyana*, and others, have now become fairly well known, and where these find a suitable home they create an effect that no other Tulips can approach. There is a peculiar brilliancy in the flaming orange-scarlet of *Greigi* and *Ostrowskyana*, and what other Tulip possesses the exquisite Water-lily shape of the long-pointed flower of *Kaufmanniana*? In a good many gardens Greig's and Kaufmann's Tulips are now well established. Deep planting, so that the sprouts may not appear too early, seems to be one of the great essentials to their welfare. In view of these gains it was a matter of deep regret when further supplies were cut off by the death of Dr. Regel, who had brought these and many other new Tulips into cultivation. That there were yet other good kinds awaiting us in the heart of Asia was a matter of little doubt, and a series of botanical expeditions to these far-off regions was therefore organised by Mr. C. G. van Tubergen of Haarlem, expeditions which have been continued up to the present time. These have been the means of adding other remarkable plants to this brilliant genus, among which the following are perhaps the most notable.

Tulipa Wilsoniana.—A Tulip of highly finished appearance, found by Sintenis in 1901, when travelling in Turan some distance east of Aschabad. The foliage is narrow, reminding one of the peculiar leaves of *T. lini-*

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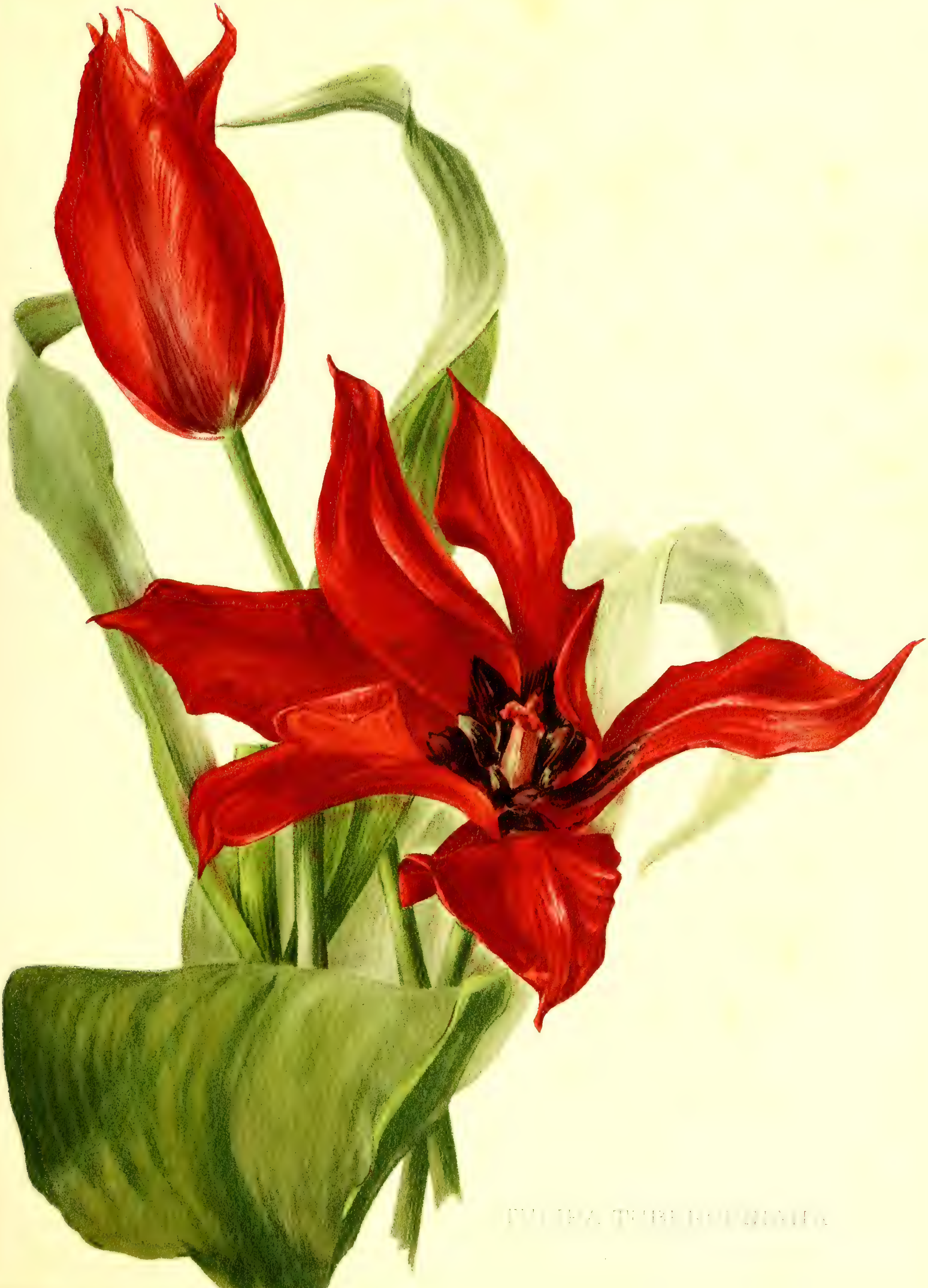
* With a coloured plate of *Tulipa Tubergeniana*, from a drawing by Miss E. Williamson.



TULIPA TUBERGENIANA

folia and *T. Batalini.* The structure of the bulb is also like that of these two species, the outer skin being of a hard parchment-like texture, while the inner one is clothed with thick woolly hairs, which protrude beyond the neck of the bulb. This is such a distinct race of Tulip that a new group might well be set up for it. It is ridiculous to bring them under the *Gesnerianæ* heading, or any of the other groups existing under Baker's or Boissier's classification. The flower of *T. Wilsoniana* is of medium size, finely rounded, and of a peculiarly brilliant and pure vermilion-red, a colour so full and glowing as to be rarely equalled even in this genus, where reds of the most brilliant description abound. The pollen of the stamens is a very bright yellow. This Tulip I named in memory of my lamented friend the late Mr. G. F. Wilson of Weybridge.

T. Micheliana.—Another important species found at the same time as *T. Wilsoniana.* In general appearance it is not unlike *T. Greigi*, and like it is remarkable in having its foliage variegated with brown, but whereas in *T. Greigi* there are a quantity of brown spots irregularly spread over the upper surface of the leaves, in this there are several unbroken stripes of brown running lengthwise down the leaf. It grows somewhat taller than Greig's Tulip and the colour of the flowers is much deeper, being a dark crimson tinged with purple. I have seen dried specimens gathered by Sintenis on the sandy steppes some distance from Aschabad, that were fully 2 feet high with very large leaves, but in our climate the plants are not so large. This Tulip is dedicated to Monsieur Marc Micheli of Geneva, one of the most distinguished continental growers of new and rare plants, whose loss we have also to deplore.

T. Tubergeniana.—The subject of our coloured plate was the outcome of an expedition sent by Mr. van Tubergen to the high mountains of Central Bokhara in the spring of 1901. This journey proved especially fruitful in good things, for in addition to the lordly *T. Tubergeniana* and other promising Tulips, such fine Irises as *bucharica* and *warleyensis*, and useful forms of Fritillaria and Corydalis, found their way home. *T. Tubergeniana*, which bears the name of Mr. C. G. van Tubergen of Haarlem, is truly a giant in size of bulb, foliage, and flowers. After three years' careful cultivation the bulbs have now reached full size and are very large, with thin outer tunics, and completely clothed on the inside with a thick layer of long, tawny-coloured, silky hairs. The erect flower-stem is stout, very tall, and markedly pubescent. The leaves of great size, are intensely glaucous and thickly set with minute white hairs, while the long flower-buds are cone- or pyramid-shaped when of full size. When fully open the flowers are campanulate or cup-shaped, with the segments distinctly reflexed about half way; their colour is an intense scarlet with an orange tinge, and the bases of the segments marked with a bold, elliptical black blotch, faintly outlined with yellow. The open flower shown in the plate does not do justice to its fine cup-shaped form, the specimens sent to England for drawing having suffered on the way. When the flowers unfold naturally on the plant they open as a perfectly rounded cup, and never present the somewhat ragged appearance of the plate. Having travelled better, the bud is very lifelike.

The three seasons during which I have grown this Tulip have shown its robust and hardy character. It never gets mildewed or disfigured in bad weather, as *T. Greigi* too often does, and takes so kindly to English gardens that bulbs planted in Sir Michael Foster's hill-garden at Shelford, soon after its introduction, have grown into fine flowering specimens which last season spread into a noble clump with about a dozen flowers open at the same time. Indeed it is not too much to say that *T. Tubergeniana* is one of the finest Tulips yet introduced, imposing as regards size and colour, and exquisite in the shape of its immense flowers.

Tulipa ingens.—This also came from the high mountains of Central Bokhara in 1901. It is of the same type as *T. Tubergeniana*, with flowers of great size and deeper colour, on a plant of dwarfer growth. Were it not for botanical features that stamp it as a distinct species, one might best liken it to *T. Eichleri.* It does not seem to possess the hardy vigour of *T. Tubergeniana*, but grows well with *T. Greigi.*

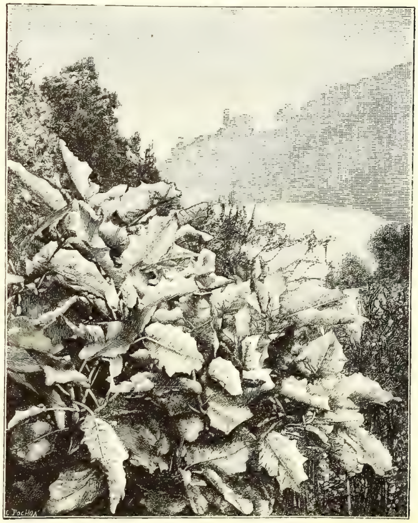
T. praestans.—Dr. Regel describes this flower under the name *Tulipa suaveolens sylvestris* in one of the early volumes of the *Acta Horti Petropolitani*. In doing so he acted on the mistaken assumption that this new and most distinct Tulip presented the wild form of the common sweet-scented red yellow-margined *Duke Van Tholl* Tulip, named *T. suaveolens* by Roth—a German botanist who lived at Vegesack near Bremen in the early part of the nineteenth century. As the *Duke Van Tholl* Tulip had been grown in Holland from time immemorial under this name, and its origin had never been disclosed, the raising of so old a kind to specific rank under a new Latin name was an action entirely to be condemned, and one wonders that subsequent authors have all blindly followed suit. Roth's original dried specimens are still preserved in the Oldenburg State Museum, and these are unmistakably the old *Duke Van Tholl* Tulip and nothing else. On further studying this wild plant from Central Asia, Dr. Regel became convinced that this Tulip, provisionally named by him *T. suaveolens sylvestris* had nothing in common with the *Duke Van Tholl*, and that it deserved specific rank as entirely new. It was therefore his intention to rename and describe it as such, but he unfortunately died without doing so. Having learned these facts through the kindness of Dr. Robert Regel of St Petersburg (son of the late Dr. Ed. Regel) I decided to myself to rename this interesting plant, of which Mr. van Tubergen has now received a fine supply through his collector. It will therefore appear in future as *T. praestans*, in place of the first misleading and cumbersome name. It has indeed already figured at the spring meetings of the Royal Horticultural Society as *Tulipa praestans*, finding an ever increasing number of admirers. The characteristics of this brilliant and early-flowering kind are as follows:—the bulb is rounded, with a particularly thick, parchment-like skin. The flower-stem varies from a few inches to $1\frac{1}{2}$ feet or more in height, and is covered, as is also the foliage, with minute, thickly set, white hairs. The flowers are either produced singly or in clusters of six to ten on a single scape, with the peculiarity that the buds are coloured in orange red on their first appearance in the centre of the foliage. The flowers, of medium size, are of an uncommon light vermilion-scarlet, with somewhat pointed flower-segments of evenly uniform shape. This is certainly one of the most remarkable Tulips ever introduced, and it also happily possesses so vigorous a constitution as to assure its permanent place in our gardens.

JOHN HOOG.

Haarlem, Holland.

BRACHYGLOTTIS REPANDA.

This handsome large-leaved shrub from New Zealand has, since its introduction in 1896, been also known under the names *Senecio Fosteri*, *S. Georgii*, and *Cineraria repanda*. Its full botanical description appears on page 163 of Sir J. D. Hooker's "Flora of New Zealand."



The plant shown has been growing at Kingswear, South Devon, for seven years and is 5 feet 6 inches in height and almost as much in its greatest diameter. Though vigorous and healthy it has so far shown no sign of flower, but I have the authority of Mr. W. E. Gumbleton for considering its flowers as unattractive and, in "Nicholson's Dictionary of Horticulture," they are stated to be minute, so that probably nothing has been lost by its failure to bloom. As a foliage plant, however, it is ornamental, with leaves which open when they are about an inch in length, and are at first of a warm ivory tint, a colour they retain until nearly 3 inches long, when the upper surface becomes pale green. This deepens with age to a dark, glossy green, often handsomely clouded with dull purple. The under sides of the mature leaves, which attain a length of 11 inches and a breadth of 8 inches, are covered with a silvery white tomentum, which, as many of the leaves of the shrub display the reverse, forms a pleasing contrast to the prevailing dark green of the foliage. The ovate leaves, with purple midribs and pale green veins, have deeply crenate margins and are carried on foot-stalks 4½ inches in length. The plant shown is by no means a record in point of size, for at Ludgvan Rectory, Cornwall, this shrub is fully 9 feet in height and as much through. There are also fine specimens in the gardens of Lord Annesley, at Castlewellan, in the north-west of Ireland, and a large plant is growing in the temperate-house at Kew. Grown in pots of light soil it makes an attractive plant for the conservatory, when the tips of the shoots are pinched frequently to secure a good shape. In New Zealand it becomes a small tree of 25 feet, with a spreading crown, and a trunk of 12 or more inches in diameter.

S. W. FITZHERBERT.

THE GREATER TREES OF THE NORTHERN FOREST.—No. 25. THE YELLOW PINE (*Pinus ponderosa*).

WHEN crossing the ashen deserts of Utah, the first great tree that meets the eye of the tree-lover is the Yellow Pine, often with a tall bare stem, and though not so impressive as the giant Pines seen while crossing the higher Pacific mountains, this tree lives in the memory owing to its way of thriving in such poor conditions. It grows well in most parts of Britain, and that it is not oftener seen is perhaps due to the idea fixed in the minds of so many planters, that the health and beauty of a Pine is only shown by its keeping the branches in the toy-tree stage which is only natural to greater pines in infancy. Even writers on Pines are under this spell, and Mr. A. D. Webster in his book on "Hardy Coniferous Trees" says of the Yellow Pine that

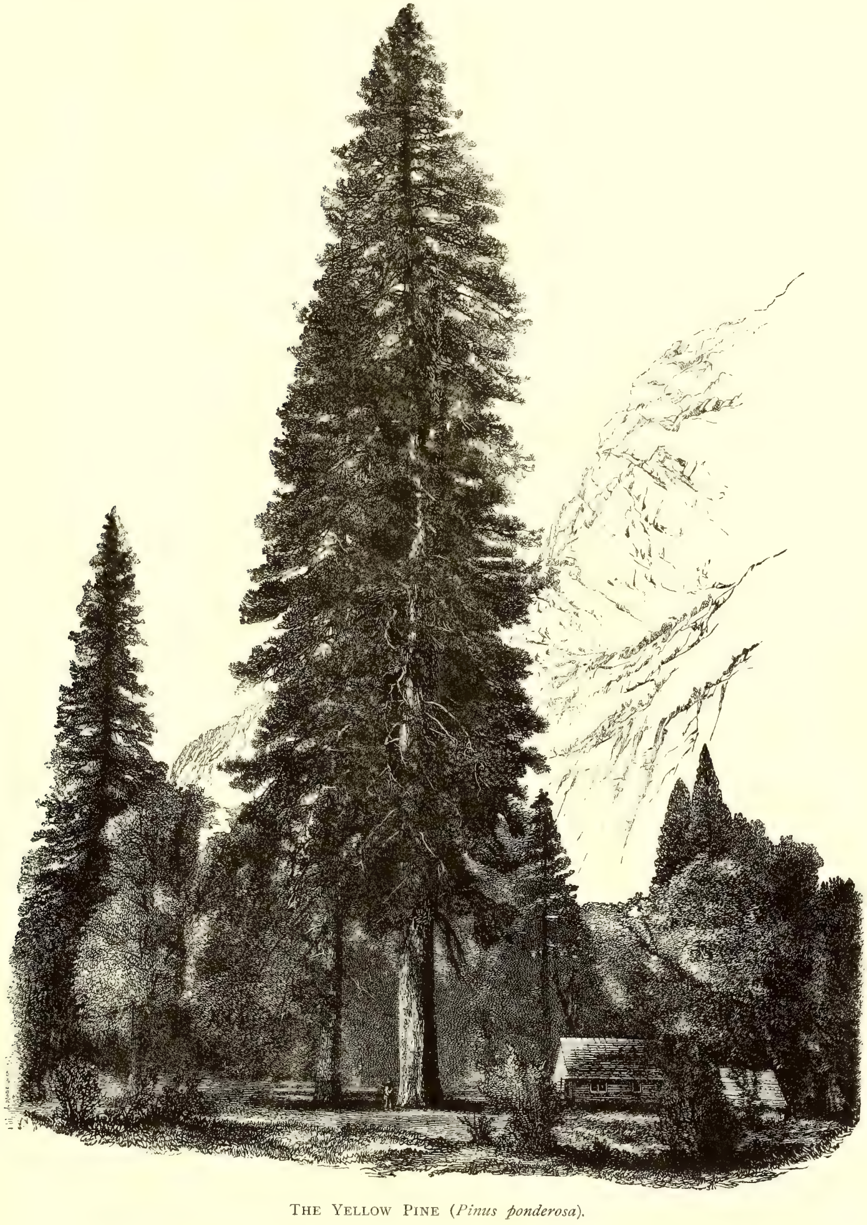
> "Much cannot be said in favour of this species, the rather lax and tortuous branches, long foliage, and generally gaunt appearance, imparting to it more of the picturesque than the beautiful."

But the pride of a Pine is in its stem, and it should be known to all planters, that the great Pines shed their branches much as other trees shed their leaves. The Californian Pines do this even more than the Pines of Europe, and one constantly sees stems of 100 feet without a branchlet. Our ways of planting have also been against the growth of this noble Pine. Isolated in grass, our often low rainfall is against it, and also the mixed shrubbery way of planting. To give this tree a fair trial I should put it in warm and open positions, and, where possible, in gritty or free soils, planting it as thickly as most other forest trees, with Larches in between and using quite young trees of say three years. The trees would then help one another in growth, shelter, protection, and effect.

Range. The Yellow Pine is one of the noblest of the trees that make up the great Pine-forests of Western America, and one of which the merits are still little known in this country. While perhaps the most variable of all the western Pines, it is a stately tree in the best conditions, growing with a narrow tapering head which forms usually from one-half to a third of its full height. Grown closely in the forests as much as three-fourths of the entire stem is often bare of branches, the tall and beautifully proportioned shafts presenting a remarkable appearance. When well-grown, it is one of the most majestic of Pines, remarkable for its poplar-like head, its large needles, and the rapidity of its growth ; when stunted through unfavourable conditions, its outline becomes more rounded, and less imposing. It not only thrives in the genial climate of the mountain slopes of California and Oregon, but also reaches far into the arid desert towards the east, cresting the mountains in the Utah region, and spreading from the Colorado River far and wide throughout the Rocky Mountains. It stands great variations of soil and climate, from the moist mountain slopes of California upwards to the arctic ridges and well-watered moraines of the higher summits, thence to the torrid lava-beds of the interior and the sun-baked "mesas" of the south, and, pushing boldly out where no other tree can exist, it forms the advance-guard of the great Pacific forest, and is the most widely-spread tree of western North America. It covers a vast track of country from N.-W. Nebraska and W. Texas, to the shores of the Pacific Ocean, and from the southern part of British Columbia southwards to Lower California and the northern parts of Mexico. In California it reaches its greatest height in the basins of filled-up lakes on the western slopes of the Sierra Nevada, where starting from elevations of nearly 2000 feet it reaches well-nigh to the limit of tree growth. Crossing the range by its lower passes it passes out to the hot, volcanic plains upon the eastern side, sweeping northwards into Oregon, where it extends to the mountains east of Goose Lake, covering their sides, save upon the highest peaks, with fine trees, and standing even upon the lava-fields of active volcanes, so near their very brink as to toss its cones among the cinders of the crater's mouth.

The Great Pine Forests. In describing his journey from the Pitt River to that of the Columbia, Dr. Newberry says :—

> "Near or distant, trees of this kind were nearly always in sight, and in the arid and really desert regions of the interior basin, we made whole days' marches in forests of Yellow Pine, of which the monotony was unbroken either by other forms of vegetation, or the stillness by the flutter of a bird or the hum of an insect. The volcanic soil, as light and dry as ashes, into which the feet of our horses sank to the fetlocks, produces hardly anything but an unending succession of these large trees."



THE YELLOW PINE (*Pinus ponderosa*).

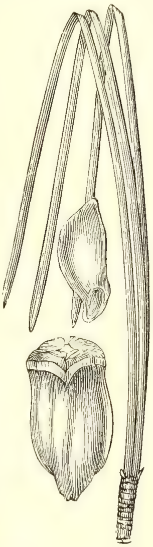
Again, in the Pacific Survey, treating of the country between the Cascades and Sierra Nevada and the Rocky Mountains, we read :—

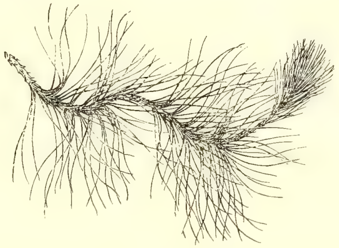
> "The climate is everywhere characterised by the absence of moisture, which, with the exception of the mountain summits which stand above the general level, gives to the surface a character to which the name of desert has been well applied. The general aspect of the botany of this region is made up of three distinct elements. The first is the grassy plains which border the streams flowing down from the mountains; on these grow a considerable variety of herbs, mostly annual, in character not unlike those of the Sacramento Valley. The second of these botanical phases is that of the Sage-plains—tracts upon which little or nothing else than clumps of *Wormwood* will grow. The third is formed by forests of the Yellow Pine. It sometimes happened to us that, during the whole of a day's ride, we were passing through a continuous forest of these Yellow Pines, in which scarcely a dozen different plants could be found. As it grows in these sterile regions, the Yellow Pine is a noble tree; and, though never rivalling the gigantic Sugar Pine (*Pinus Lambertiana*) in its dimensions, it claims the second place among the western Pines. At M‘Cumber's we saw many trees of this kind which measured 6 to 7 feet in diameter, 3 feet from the ground; and near the base of Mount Jefferson in Oregon, I saw one that was 25 feet in circumference at the same height. Again, at a height of nearly 4,000 feet in the Merced Canon, was a giant tree well over 200 feet high, and nearly 9 feet in diameter at the base."

On the Sierras it grows at elevations of from 1,500 to 9,000 feet, attaining a height of 100 to nearly 250 feet, and seen at its best in the gravelly lake basins of the older Yosemites, where it is so abundant as to be called the "Yosemite Pine."

Wood. The Yellow Pine is the principal timber tree of many of the Western States, forming an immense pillar-like trunk which tapers very gradually and is often 6 to 8 feet in diameter at the base. The wood is in general highly resinous, and though hard, heavy, and very finely grained, it is brittle and less valuable than that of the Sugar Pine. But like the "Pitch-pine" of the Eastern States, it is often of excellent quality, containing little resin, soft, tough, and durable. The colour of the mature wood is yellowish-brown or light red, growing darker when full of resin; the heart-wood is then sometimes so heavy as to sink in water. The sap-wood is nearly white and often very thick, though it varies strangely as to amount in different trees, as well as in different parts of its area. The sap-wood is so slowly converted into heart-wood that the tree often shows from 100 to 200 annual rings before the change commences, and fine mature trees are thus of great age. The wood is mainly used for building, as piles for jetties and embankments, for railway sleepers, fencing, and as fuel. In the early days of California it was a common thing to fence land quickly and easily by felling successive trees of Yellow Pine, laying their stems end to end as a wasteful but effective barrier. From its large amount of resin the wood is difficult to work, oil being constantly required for the tools, while it may be recognised at once by its penetrating odour. In times of scarcity Sargent says that the Indians have been in the habit of stripping the bark in early spring, to get at the soft layers just beneath it which are scraped away and eaten as food. The tree shows a tendency to twist which is very marked in a forest of these trees, the grain of trunk and branches being often seen coiled into the closest possible spiral.

General Features. The bark of the Yellow Pine is of a light yellow or reddish-brown in the younger trees, becoming nearly black when old, and deeply ridged and grooved. By these irregular channels it is divided into flakes which measure from a few inches square to large plates 12 to 18 inches across, several feet in length, and 3 to 4 inches thick. The strange appearance of these flat, smooth plates enable one to distinguish the trunk of this tree at a considerable distance. Upon old trees this thick layer of bark is made a storehouse for acorns by the woodpeckers, and it is a common thing to see numbers of these trees having their bark cut into a honey-comb by thickly-set holes as large as thimbles, or as thickly set with the inserted acorns. The colour of the leaf is a dark yellow-green, 5 inches to more than a foot long in some forms, and the appearance of the leaf-clusters as great tufts at the ends of the naked branches, give to the smaller ones a beaded look unlike that of any other western Pine. The main branches are stout and divided over and over again, and, though drooping, are generally tilted upwards towards the end in a way that adds to the distinct appearance of the tree. The smaller branches, and especially the central shoot in young trees, are deeply marked with the scales of the fallen leaves, and often closely resemble the leaf-scars of fossil trees of the coal period. If broken across these younger branchlets are fragrant as with the strong pungency of orange-peel, while their bark is orange-coloured or pale bright red, though in old or stunted trees it becomes dark. The male flowers are peculiar for their great length, often measuring 3 to 5 inches, and forming large reddish rosettes about the bud, or the few leaves at the ends of the male branchlets. The cones are mostly from 3 to 6 inches in length (but sometimes nearly twice this size), oval in shape, with the bosses of the scales bearing small hooked spines or prickles. They hang singly or in clusters of from 2 to 5, mostly at the ends of the smaller branches, and may be bright green or purple, the two colours sometimes occurring upon trees growing side by side, but oftener in distinct groves of one colour. They stand erect while young, falling gradually to the horizontal when fully grown, and never drooping as in most of the Californian Pines. When fully ripe they break and fall, leaving





the lower scales upon the branch and increasing its rough appearance. The seeds are mostly only a little larger than Apple-seeds, but in some forms are nearly half-an-inch long and form the food of many kinds of birds.

Forest Charms. A writer in *Woods and Forests* gives the following impressions of the Yellow Pine:—

> "I have oftentimes feasted on the beauty of these noble trees when they were towering in all their winter grandeur, laden with snow—one mass of bloom; in summer, too, when the brown flower clusters hang thick among the shimmering needles, and the thick purple burs are ripening in the mellow light; but it is during cloudless wind-storms that these colossal Pines are most richly beautiful. Then they bow like Willows, their leaves streaming forward all in one direction, and, when the sun shines upon them at the required angle, entire groves glow as if every leaf were burnished silver. To me there is something strangely impressive in this play of light upon these Pines. It seems beaten to the finest dust, and is shed off in myriads of minute sparkles that seem to come from the very heart of the trees—as if, like rain falling on fertile soil, it has been absorbed, to re-appear in flowers of light.
>
> The trees also give forth the finest music to the wind. After listening to it in all kinds of winds, night and day, season after season, I think I could tell my position on the mountains by this Pine-music alone. If you would catch the tones of separate needles, climb a tree. They are well tempered, and give forth no uncertain note, each sounding for itself, with no interference excepting during heavy gales; then you may detect the click of one needle upon another, readily distinguishable from their free, wing-like hum. Some idea of their temper may be drawn from the fact that, notwithstanding their length, the vibrations that give rise to their peculiar shimmering light are made at the rate of 250 per minute."

Natural Forms of the Yellow Pine. Inhabiting such a vast range of country, and living under such variable conditions, now in alpine meadows or old lake-basins, now in swamps, and now in hot gravelly plains as in Mendocino county, California, there is great variety in the form and size of the tree, the quality of its timber, the length and number of its leaves, and the size and character of the cones. These last vary widely, those in the dense forests being very small, while those of isolated trees standing in alpine meadows or on open mountain sides, are from four to six times larger. In the presence of such wide variation the natural forms of the tree assume a certain importance, and we therefore give descriptions of the principal forms from Prof. Sargent's "Silva of North America."

Pinus Ponderosa var. Jeffreyii.—This is in the main a mountain form, occurring on the dry volcanic foothills of Southern Oregon, and common in the great forests of Yellow Pine which clothe the slope of the central and southern Sierras of California; though it crests the range it is only common at high elevations on the seaward slopes, where it maintains itself on the driest and most exposed ridges, though often reduced to the size of a mere shrub with stout semi-prostrate branches full of knots and angles, and bearing cones as large as pine-apples. As one descends it gives place to the parent form, and less hardy conifers of the Pacific coast-belt. From northern California, where it was first reported by John Jeffrey in 1850, it stretches away to the northern part of Lower California where it forms large forests extending south as far as the middle of the peninsula where another distinct large-coned form is encountered in *peninsularis.* Though a smaller tree than *ponderosa*, at its greatest it attains a height of 100 to nearly 200 feet, making a massive trunk covered with darker red bark, more finely divided into irregular plates. It is characterised by more pungently aromatic juices, stiffer and more elastic leaves which vary in length from 4 to 9 inches, and are more persistent than in *ponderosa* itself. The seeds also are much larger, measuring sometimes nearly half-an-inch and produced by short-stalked purple cones of 5 to 12 inches, armed with prickles that are hooked backwards. The wood is coarser-grained, very resinous, light yellow in colour, with a thin layer of pale yellow or nearly white sap-wood. This is often considered the best form of all for beauty, health, and general effect.

P. PONDEROSA var. SCOPULARUM.—A form known as the Yellow Pine of Nebraska or Colorado, growing as a small tree of spire-like outline, with black or bright-red bark, deeply furrowed and broken into large scaly plates. The foliage is tufted and scanty, composed of rigid leaves 3 to 6 inches long, and arranged in clusters of two or three together. Cones green and small, greyish-brown when ripe, usually only 2 inches long (rarely as much as 4 inches) and covered with slender prickles hooking backwards. The wood is coarse-grained, very hard, brittle, and resinous. This form is a common tree of the mountain forests of the Black Hills of South Dakota, extending thence to the mountains of Wyoming and eastern Montana. On the high plateau of Colorado it forms one of the most extensive pine-forests of the continent, and exists in other parts of the same state as open stunted forest, in company with Nut Pine, Juniper, and Douglas Spruce, rising to elevations of 6,000 to 10,000 feet. This variety is also fairly frequent in parts of Utah, Texas, New Mexico, and Arizona.

P. PONDEROSA var. MAYRIANA.—Differs from the northern forms of *ponderosa* in its much longer and broader leaves, which at times reach a length of 14 or 15 inches, and a breadth of one-sixteenth of an inch. Its cones also are oblique in shape from the markedly greater development of the scales upon the upper side. This variety forms a large part of the mountain forests of southern Arizona, the individual trees rarely rising much above medium height. Its wood is soft, brittle, and of light red-brown colour, traversed by broad dark bands of small highly-resinous summer-cells and resin-passages, and by obscure medullary rays, the whole enclosed in a layer of thick, pale sap-wood. Towards the south it merges gradually into var. *peninsularis.*

In the same mountains of southern Arizona there occurs yet another form (probably the *Pinus Apacheca* of Limmon). Its leaves are slender and variable in length, but usually 12 to 14 inches, and arranged in clusters normally of three, but occasionally of four or five together. Its cones of 3 to 5 inches are also variable, and very characteristic in their thickened scales terminating in raised projections armed with straight, slender prickles. Less widely-spread than other varieties, this is mainly confined to the mountains of southern Arizona and southern New Mexico, forming the tallest trees of these forests, with a massive trunk covered with thick reddish bark broken into great irregular plates, the crown of stout and twisted branches making a broadly-open round-topped head. These trees, in which the leaf-clusters contain four or five leaves, seem to connect *P. ponderosa* with *P. arizonica*, which itself differs little from our tree save in its dwarfed proportions, and that two to seven leaves go to make up its leaf-clusters. Beside *peninsularis* in Lower California, other minor forms are *pendula*, *deflexa*, and *nigricans*, the last a small form keeping its branches longer than the other varieties. Two garden forms singled out for their distinct character as seen in English parks are var. *Parryana* (Highnam Court, near Gloucester) in which the branches are more numerous and thickly clothed than in the common kind, the leaves long and drooping; and a second known as var. *Sinclairiana* (Pampesford Hall near Cambridge) which differs in having many sub-erect branches, clothed at their tips with short thick leaves which are quite glaucous.

In Europe. In our country the young trees are very sturdy, of rapid growth when suited as to soil and climate, while very distinct in their long stout leaves, and of noble aspect. They are hardy in all parts of Britain, some of the finest examples being found in Scotland. Though first introduced early in the last century, many years passed before the Yellow Pine was much planted; some trees have however reached upwards of 60 feet in height, with every promise of yielding valuable timber at maturity. The branches are few, coming in regular whorls and spreading flat until the tree becomes old, when they droop more and more, rising fold upon fold in a stately cone-like head. This Pine is rather subject to the attacks of a small Pine-beetle (*Hylurgus piniperda*), which destroys the shoots of young trees by boring in their heart-tissues. In American forests it is also infested by a plant parasite allied to the common Mistletoe, which not infrequently takes possession of an entire tree sprouting with peculiar effect from all the growing branches.

While *Pinus ponderosa* has been somewhat neglected by planters, its mountain form *Jeffreyii* has been more generally grown in northern Europe and the eastern United States, where, strange to say, the parent is a complete failure, growing slowly until carried off by disease. But whereas in the eastern United States *ponderosa Jeffreyii* is of faster growth, *ponderosa* itself would seem to have the advantage in Europe, though only partial comparison is possible in this country owing to the fact that *Pinus Jeffreyii* has been little planted save in Scotland. In predicting a great future for the Yellow Pine in France, Mouillefert says that at Grignon, upon limestone soil of quite an ordinary character, *Pinus ponderosa* has grown 27 feet with a girth of 2 feet in sixteen years, completely outstripping Corsican Pines, grown under the same conditions.

Jeffrey's Pine grows as a handsome tree of rich colour, shorter and more rounded in outline, with branches less divided, and foliage of a paler green. It fruits freely, the cones being large and easily mistaken for those of *Pinus canariensis*, especially as the leaf-arrangement of the two trees is identical. It is said to be less subject to disease than *ponderosa*, and is so hardy as to stand uninjured the winters of the south of Sweden and St. Petersburg. Its wood is valuable like that of the parent, very regular in growth, and durable when mature though soft in a young state.

Synonyms.—*Pinus ponderosa*, Douglas; *P. Beardsleyi*, Murray; *P. Benthamiana*, Hartwig; *P. brachyptera*, Engelmann; *P. Craigiana*, Murray; *P. Engelmanni*, Torrey; *P. Parryana*, Gordon (not Engelmann).

References.—Sargent, Silva of North America, vol. 11, p. 77; Loudon, Arboretum, vol. 4, p. 2243; Veitch's Manual, p. 165; Sierra Club Bulletins, vol. 2, p. 71; Webster, Hardy Coniferous Trees, p. 99; Mouillefert, Essences Forestière, p. 520; Gordon, Pinetum, p. 281; Watson, Botany of California, vol. 2, p. 125; Journal R.H.S., vol. 14, p. 69, 96, 121; Woods and Forests, many notes.

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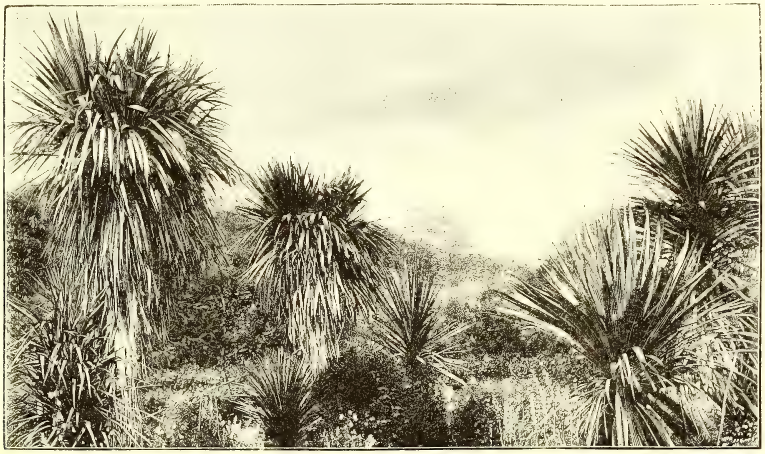
CORDYLINES FOR FINE EFFECT.

Our engraving is from a photograph sent to us by Lady Onslow from Cill Alaithe near Killala, on the west coast of Ireland, and shows what may be done to gain sub-tropical effects, by the planting of the hardier Cordylines in gardens near the sea. Lady Onslow adds the following interesting note:—"This is no sheltered bay facing the sunshine and shut off from the outer world like many of those near Cork and Queenstown, where the winter temperature almost rivals that of the Riviera. On the contrary, the climate here is not at all what one could wish for tender plants, for the garden is constantly buffeted by the roughest of winds that sweep down from the Atlantic upon the north-west coast of Ireland, and,—best proof of all as to what may be done on our western coasts—it did not exist twelve years ago."



View in Garden at Cill Alaithe. *Engraved for "Flora and Sylva."*

CORIARIA: WITH A PLATE OF CORIARIA TERMINALIS.*

Though of minor importance from a garden standpoint this group contains two or three handsome kinds, while the whole family is exceedingly interesting in its structural peculiarities. The genus is not a large one but is widely spread, with one kind in Europe and North Africa; others reaching from the Himalayas through China to the far east; while another section with an uncertain number of kinds spreads over South America and New Zealand. Wholly distinct from any other plants, not only are the Corarias classed by themselves in an order of which they are the sole representatives, but it has also been found impossible to relate this to any other order, and it therefore stands in isolation. From the study of fossil remains however it would seem that at one time there were many other species, five or six extinct kinds having been traced in Europe, their disappearance being probably due to climatic changes which may have swept away connecting links in the chain of plant relationship. The one kind now found in Europe (*C. myrtifolia*) is an old garden plant long known as the "Tanner's Tree," but of little value apart from the economic uses to which it owed its name and a measure of importance. The name Coriaria is derived from the use of its roots in tanning leather, for which it is still valued in parts of Russia and the Turkish provinces.

The peculiarity of these shrubs is in the formation of their berry-like fruits. The flowers are small and inconspicuous, with scale-like petals of green, yellow, brown, or pink, and the sexes mostly apart though found upon the same plant. After flowering however the tiny petals thicken and swell into a juicy fruit-like envelope surrounding the cluster of seeds in the centre, and very handsome when brilliantly coloured as in the finer kinds:—orange-yellow in *terminalis*, crimson in *japonica*, blue in *nepalensis maxima*, and purple in certain of the New Zealand species. While of tempting appearance all these fruits are more or less poisonous, though the natives of New Zealand are said to brew a pleasant drink from the berries of one kind, and a new species (*C. himalayensis ?*) said to have come recently from the colder regions of the Himalayas, is said to be evergreen, hardy, and to bear edible fruit. Whether this be so, time will show. All the kinds are of the easiest culture in moist, loamy soils, the best kinds being hardy, at least at the root, and growing again when cut down by frost. About six kinds have been introduced, though it is doubtful whether some of them are now to be found, unless it be in botanical collections.

C. japonica.—One of the handsomest kinds, growing as a low, branching shrub with square and woody stems of warm reddish-brown, reaching at last a height of 8 to 10 feet. The leaves come in opposite pairs, arranged regularly along either side of the stem, and are shortly stalked, 2 inches long, narrowly oval and sharply pointed in shape, with three prominent veins. The flowers are very small, of a pretty pink or coral-red colour, and appear early in June upon the stems of the previous year, bursting from the old leaf-scars as racemes of 1½ to 3 inches which are clustered two or three together, the male flowers (when present

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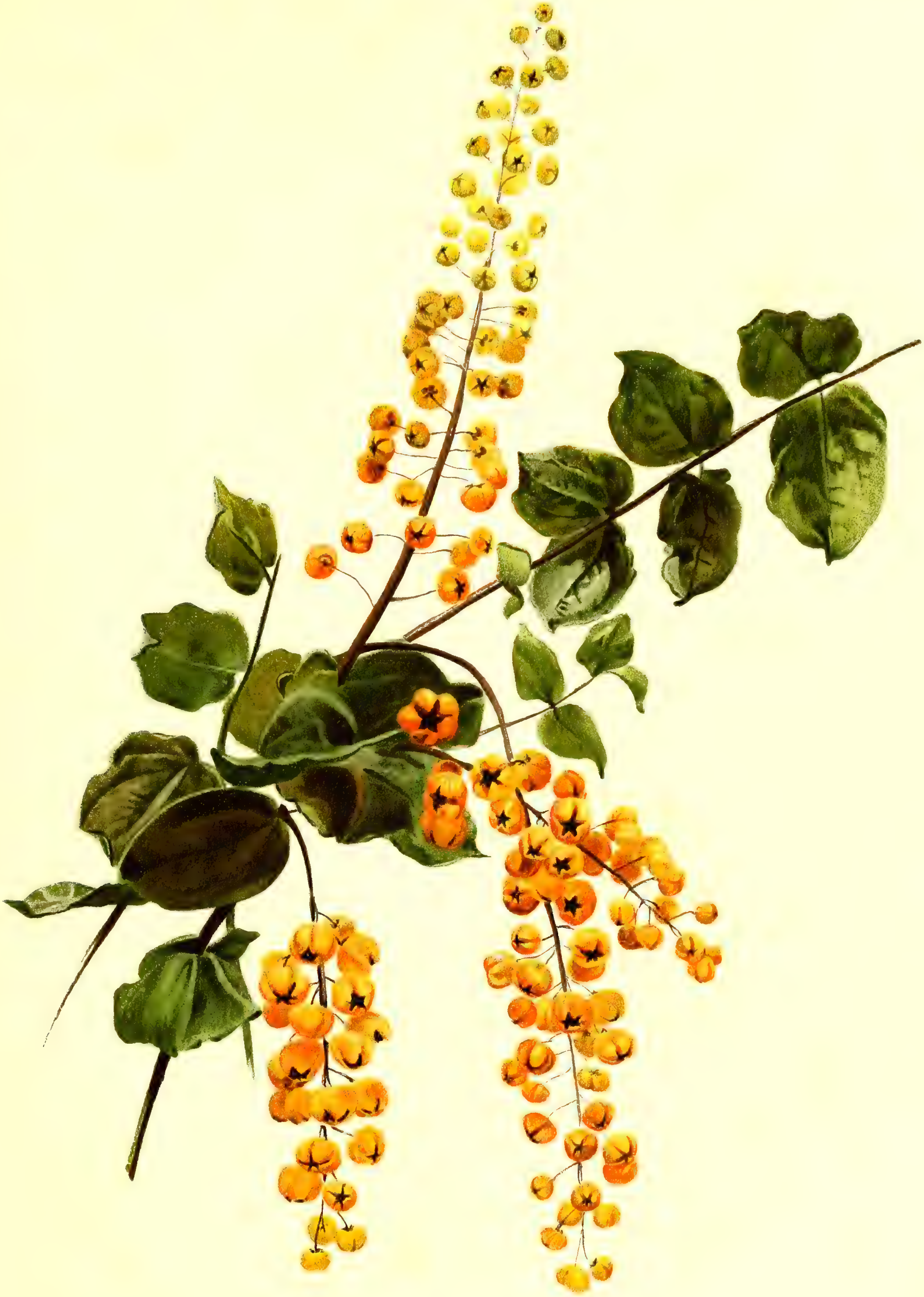
* From a drawing by H. G. Moon.



CORIARIA TERMINALIS

at all) confined to one raceme. This is one of the kinds in which the male and female flowers are most unlike, the first coming in slender racemes which droop at maturity and show the long filaments of the pollen-bearers, while the seed-flowers are in stouter and more erect racemes. The fruits are round and bright red in colour, rendering this one of the most striking of dwarf shrubs. Seed was sent from Japan by Mr. Veitch in 1893, and plants also reached Kew from America about the same time, the first plant to flower in this country being in the garden of Canon Ellacombe at Bitton in 1896. Since then fruits have been shown upon one or two occasions at meetings of the R.H.S. but it is still a scarce shrub, though certain to be more planted when better known. From the conflicting descriptions given in trade lists this plant is seemingly much confused with *C. terminalis*, though perfectly distinct from it.

C. myrtifolia.—From Europe and the north of Africa, where it grows rankly beside water, and holds its own on the poorest and driest of ground, spreading by suckers from the root. In northern Europe it has been cultivated for upwards of 300 years and may be met with here and there in this country, being fairly hardy at the root though its stems perish in winter; it is late in starting into growth and does not fruit with us, so that in view of its poisonous character it is not worth growing. The shoots rise very fast when once started to a height of 4 to 6 feet, arching gracefully, and covered with small pointed leaves of dark green. The flowers are small and greenish, followed in warmer climates by dark purplish berries which are highly poisonous, as are also the young leaves, the narcotic effect of even a small quantity making animals to stagger and fall as if intoxicated, and not infrequently causing death. Beside its use in tanning, it yields an inferior kind of varnish, and a substance employed in dyeing dark fabrics, while the dried and powdered leaves are sometimes used to adulterate senna, which so treated becomes a powerful and dangerous drug.

C. nepalensis.—A vigorous shrub of nearly 20 feet high upon the mountain slopes of Bhotan and Sikkim, where it grows at elevations of 2,500 to 11,000 feet, extending thence eastward to China and Japan. Though fairly hardy at the root in southern gardens its stems are so liable to injury as to make little progress in colder districts, where it is best under glass, as in the temperate house at Kew. It is there trained to a height of 12 feet around a pillar, growing freely and fruiting from time to time. Its stems are more woody in character than in others of the Asiatic group, while its three-nerved leaves and axillary clusters of flowers and fruit readily distinguish it from *C. terminalis*, with which however it was long confused. The flowers are brown, appearing in May, followed by black fruits, which in the variety *maxima* are large and of a bluish colour. In the south-west of England and along the south coast this plant succeeds in the open as a stout spreading shrub for the rock-garden.

C. ruscifolia.—A plant from New Zealand and South America, where it grows as a tall shrubby climber of 10 to 20 feet, with square stems and long slender branches prettily arched. Introduced many years ago, it was first grown as a greenhouse plant, for its graceful habit and fresh green foliage, with sprays of tiny green flowers drooping prettily from the leaf-axils. As a tender plant it soon disappeared, but has lingered on here and there in the open, proving perfectly hardy even into Scotland and adapting itself to our climate as an herbaceous perennial, while, though deciduous, the stems remain under glass, or when grown against walls in the south of England. It is of distinct appearance, the leaves set in opposite pairs along the shoots, bright green in colour, and either very shortly stemmed or sessile and clasping each other at the base. The male and female flowers are apart but on the same plant, coming in slender racemes of 6 to 12 inches long. Towards autumn the tiny green petals swell into beautiful juicy fruits of a fine purple colour, and very handsome though apt to be spoiled by insects if unprotected, wasps showing an especial fondness for them. They ripen in September and October, and render this a most effective wall or border plant at that season, though unfortunately so rare as to be quite unknown in nurseries. In New Zealand the fruits are gathered by the natives for a pleasant drink made from the purple juice, which when fermented is said to resemble

Elderberry wine. The seeds however should be carefully rejected, causing convulsions and death if eaten by misadventure. Syn. *C. sarmentosa.*

C. sinica.—A plant from China, coming very near *C. japonica* and flowering at the same season, but in which the berries are smaller and composed of three carpels in place of five in the Japanese species.

C. terminalis.—A plant first collected by Hooker in the mountains of Sikkim and for many years accepted as a variety of *C. nepalensis*, till fresh specimens from the Thibetan frontier of China (where it grows at a height of 9,000 to 13,000 feet) proved it to be perfectly distinct. It is quite hardy in the southern parts of the country at least, making shrubby rootstock and herbaceous stems of 2 to 3 feet, which die back each winter to start again in spring. Their bark is rough and warty, reddening in the sun, and the shoots thickly set with pairs of rounded, dull green leaves, upon very short stalks. They are 1 to 2 inches long, prominently netted with transparent veins (five to nine in number, but mostly seven), the upper surface shaded with purplish-brown in patches towards the autumn. The flowers of yellow and chocolate colour appear in long crowded racemes from the tips of the shoots, differing in this particular from all the other kinds, in which they burst from the leaf-axils. The flowers are inconspicuous but give place to glossy, berry-like fruits of great beauty, their rich orange-yellow prettily contrasted with the deep red of the downy stem and the dark core of brown seeds, while the long tapering spike is graceful and unlike that of any other hardy shrub. These fruits are in beauty during September and October, lasting well upon the plant, but of no value for cutting because of the way in which the leaves shrivel and fall. The sprays of fruit shown in our plate hardly do justice to the beauty of this handsome shrub, some that I measured last autumn upon main shoots being fully 9 inches long and crowded with berries throughout their length, smaller racemes, such as those shown, coming at the tips of the side-shoots. The plant does best in a moist and sunny place, but as the fruits are poisonous, this should be borne in mind when planting, so as to keep the showy, glistening clusters out of the way of children. Received an award of merit when exhibited before the R.H.S. by Messrs. Veitch of Exeter, in October of last year.

Other Species.

With the exception of *C. ruscifolia*, the species found in South America and New Zealand are but imperfectly known. In New Zealand the Coriaria is common under such a variety of forms running one into the other, that so far botanists have found it impossible to reduce them to order. With the colonists they bear one common name of "Tutu," and vary in size from forest trees, with a trunk of nearly 2 feet in diameter, to slender mountain herbs with annual stems of a few inches only. The kinds considered to be the most distinct are as follows:—*C. arborea*, or the Tree Tutu, growing to a large size in forests of the western coast, its wood soft but finely marked, and in some demand for light cabinet-work. The second plant known as the Square-stemmed Tutu has been described under its botanical name of *C. ruscifolia.* Two smaller forms are also distinct; *C. microphylla* or *thymifolia*, a dwarf alpine plant of only a foot or so high, with tiny leaves and stems that often die away in winter, though this character varies with the altitude at which it is found; the flowers are as in *ruscifolia*, but smaller. It has been grown in cool houses in this country, but is of purely botanical interest, and its only use the making of an ink which resists sea-water. The fourth kind, *C. angustissima*, is a rather pretty little shrub, 6 to 18 inches high, growing in broad patches of feathery effect upon the mountain side, more especially beside water. The stems are thickly covered with very narrow, drooping leaves, while the fruits are large in proportion, black and glossy, and so freely borne on the plume-like shoots as to be graceful and effective. These plants are all more or less poisonous, and each form merges into intermediate varieties by insensible stages, until it seems impossible to fix certain data, the more so as the genus continues through a further series of forms more or less similar in appearance, extending over the mountains of South America from Chili to Mexico, including vast tracts of which the vegetation is little known. B.

HARDY CACTI.

For many hundreds of years one hardy little Cactus—*Opuntia vulgaris*—has been known in Europe, growing wild or semi-wild in certain southern valleys, particularly those of Valais in Switzerland, Southern Tyrol, and the Valley of Aosta. Nor is it easy to account for this fact, since all the true Cacti come from Central America, and yet we find this little stranger growing wild in the heart of Europe, where it has been so long known in our Swiss valleys as to imply natural rather than other means of distribution. In common with other botanists I am inclined to think that this may have been brought about by migratory birds that, straying from their course, may have carried seeds upon claws or feathers and thus founded a little colony of Cacti in Europe. That this is not so unlikely as may seem, is shown by the great traveller, Bonvalot, who, when in the high tablelands of Thibet and Central Asia, constantly saw stray birds from other parts of the world and apparently brought there by storms. When this possible explanation was submitted to M. de Candolle he agreed that this might easily be the source of the early introduction of this plant to the mountains of Europe. But let its origin amongst us be what it may, the *Opuntia vulgaris* is hardy in all parts of Europe where it can find a fair degree of summer heat, free from excess of moisture. In our Swiss villages it is seen well-nigh everywhere, covering the crumbling walls, nestling amongst the heaped stones of the garden, or in ancient pots which for generations have stood in the sunny window corners of the mountain chalets, the strangely flattened growths bursting forth from year to year with cheery flowers of pale bright yellow during summer. In his botanical dictionary, Paxton fixes the year 1596 as the date of its introduction to the gardens of Europe.

Some thirty years ago two other nearly allied kinds—Opuntias *camanchica* and *Raffinesquii*, classed as distinct species in the *Index Kewensis*—reached us from the warmer parts of the United States, and though often treated as greenhouse plants, these also are hardy throughout Central Europe, when grown under natural conditions. More recently, and within the past fifteen years, the German traveller Dr. Purpus (followed by various American botanists) has scoured the mountains of Arkansas, Texas, Colorado, and Arizona, bringing to light a rich variety of hardy Cacti thriving at elevations of 5,000 to 8,000 feet. For these new plants (now coming into cultivation) we are mainly indebted to the collection of Dr. Purpus, presented in the first instance to the botanical garden of Darmstadt, and distributed thence throughout Germany and other parts

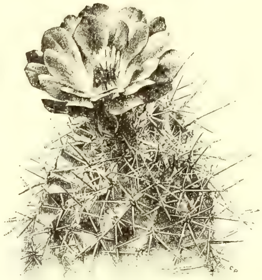
Opuntia Camanchica.

of Europe. Dr. Purpus has also placed these plants within the reach of private growers by furnishing such firms as Späth of Berlin, and De Laet of Contich near Antwerp, with the kinds now in commerce, though many others are yet unclassed and without name. The entire collection contains upwards of 100 kinds of Cacti (species and varieties) of proved hardiness at Darmstadt, and consequently throughout Central Europe, many of them plants of real beauty, and of value for our rock and wall gardens. Amongst them is an Agave —A. Parryi—found at an elevation of 7,000 feet in the mountains of Arizona, and perfectly hardy with us in places where the famous *Agave Utahensis* has perished winter after winter. Among the plants already introduced to gardens, the Opuntias hold the first place. Several kinds are altogether different from *O. vulgaris*, and there are some in which the flowers are not only red, but bright scarlet—a colour previously unknown among hardy Opuntias.

The original collection at Darmstadt fills a large rock-garden, composed of limestone blocks and covering nearly 100 square metres of ground. Dr. Purpus considers the use of limestone as important if not essential for these plants, all of them being found upon rocks and in soils of this nature. In many of the botanical gardens of Germany which I visited in 1904, a great feature is now made of these hardy Cacti, and their value is already well seen at Giessen—where there is a very fine collection—at Jena, Leipzig, Magdebourg, Dusseldorf, and many other places in which they seem to thrive to perfection. Since the death of M. Marc Micheli, the collection at the Jardin d'Acclimatation, Floraire, has been the only one existing in the neighbourhood of Geneva, and it is of this that I purpose speaking more particularly. The first selection received from Herr Späth was subsequently enlarged by Dr. Purpus and others, until we are now in possession of an excellent collection, recently brought up to date by valuable additions from M. De Laet, —the purchaser of the entire private collection of Dr. Purpus.

Kinds. In glancing rapidly over these gains, we find that the genus *Opuntia* holds the place of honour among hardy Cacti. Such plants as *Echinocactus Simpsoni*, *Cereus viridiflorus*, and *Mammillarias missouriensis* and *radiosa vivipara*, are more interesting than beautiful in their flowers, attraction lying rather in the pretty little coloured fruits by which these are succeeded, and their quaint general appearance. *Echinocereus* or better *Cereus Phoeniceus*, of which we give an illustration, is however one of the best of the hardy Cacti, from the mountains of New Mexico and about San Francisco. Old plants form dense rounded masses of more than a foot across, and composed of separate fleshy heads 2 to 3 inches high and 2 inches thick, such masses sometimes containing over 200 heads, as in the garden of M. De Laet at Antwerp. While in bloom from May to July, such old plants are very beautiful, the flowers reddish-green without and dark red within, paling to yellow at the base. They are about 2 inches across and last for 7 to 10 days, while the plant is quite hardy in so cold and damp a climate as that of Belgium. Many of the Opuntias give beautiful flowers from the middle of June into the early days of October, flowers which are in many cases remarkable for their bright colour. Two hardy kinds have already been named in connection with *O. vulgaris*, though distinct in their general effect, in the shape and size of their jointed stems, and the number and nature of their spines—which are the rudimentary leaves of the Cactus. But in addition to these the following kinds may be considered as hardy throughout Central Europe:—

Opuntia arborescens, which rises tree-like in its wild state upon a stout stem of 30 feet or more, covered thickly with clusters of sharp spines, and bearing many flowers of rose or rosy-purple colour. In Central Europe it spreads along the ground instead of rising erect, and is the least hardy of the kinds grown in the open. If we refer again to *Opuntia camanchica* it is to name its seven varieties, some of which are so distinct that they might well be classed as separate species. They are:—*albispina*, with large flowers of brownish-yellow and long white spines upon the joints; *pallida*, with flowers of very pale yellow; *rubra*, a beautiful little plant in which the flowers are rosy or deep pink, with golden stamens; *spinocentra*, with large yellow flowers; and *gigantea*, *orbicularis*, and *salmonea*, which have not yet flowered at Floraire. The *Opuntia polyacantha*—better known perhaps as *missouriensis*—bears pale yellow flowers upon large, flat joints, studded with fine spines set in bunches of yellow down. It is a creeping plant, and has been in cultivation since 1814, but until late years always under glass. Of this there are two beautiful varieties in *erythrostemma*, a little gem, in which the yellow flowers are adorned with red stamens; and *salmonea*, with cheery flowers of salmon-pink. *Opuntia fragilis* is another old greenhouse plant, of drooping habit, its short, rounded joints thickly set with white spines and little yellow flowers. Its variety *caespitosa* is of more compact growth, with larger yellow flowers shading to brown in the centre, and bright red stamens. *Opuntia mesacantha* grows as a little tuft of spreading, spiny growths, crowned during summer with bright yellow flowers; while *Opuntia Greenii* bears beautiful flowers of pale lemon-yellow. But it is perhaps the *Opuntias Rhodantha* and *xanthostemma* which are the finest of all. The first exists under five distinct forms, as follows:—*O. Rhodantha*, with large rosy-lilac flowers of rich silky texture, the stamens bright red, and the style green; var. *brevispina*, in which the joints are large and of a dark grey-green, covered with short



Echinocereus Phoeniceus.

spines, and bearing very large flowers of intense carmine colour; *flavispina*, with smaller, pale green joints, studded with larger spines which in their early stages are yellow with green tips, the flowers large and rose-coloured; *pisciformis*, so called from the fish-like joints studded by flowers of pale pink with bright red stamens; and *Schumannianæ*, with the largest flowers of all—2 inches or more across—of clear bright crimson, borne upon erect growths of a pretty bluish-green colour. *Opuntia xanthostemma* bears flowers of carmine-purple to which the golden stamens give a peculiarly striking effect, and it also exists in several varieties, as follows:—*elegans*, with large rosy flowers of glossy texture, glistening as though varnished when newly expanded; *fulgens*, with flowers of glowing carmine; *gracilis*, in which they are smaller and of pale pink; *orbicularis*, with rounded growths and many pale pink flowers of 2 to 3 inches across; and *rosea*, with numerous blossoms of blush-pink. Other kinds such as the Opuntias *arenaria*, *arkansana*, *cymochila*, *hybrida*, *macrorhiza*, and *phæacantha*, have now lived in the open air for several seasons, but have not yet flowered at Floraire: all the plants we have named, with others too numerous to mention, thrive in the open air with complete success.

Cultivation. To do well they must have a sunny spot—and this is more than ever necessary in England—as open to the winds as their own mountain tops, but dry, thoroughly drained, and with a sufficient layer of limestone soil. At Geneva we find them to flourish in a narrow border thrown up against a low wall of 3 feet high, exposed to full sunlight, and so built that stagnant moisture is impossible. The collections I have seen in Germany are grown upon banks (never on the flat) exposed to full sun, and facing south. From my own experience I can warmly recommend the culture of these Cacti, so full of interest to lovers of hardy plants, who may rely upon the kinds named as being those that have given the best results in my own collection, or which I have seen thriving with others. H. CORREVON.

Floraire, Geneva.

Diseased Beech.—You may be interested in some samples from Beech which I have just cut down. This tree was not visibly in bad health, and the outward signs of disease were of the slightest. This being so, I was surprised to find the centre rotten at 12 feet from the ground. I am sending a piece of this touchwood, and a section of one of the two trunks at 20 feet from the ground. The tree was of fair size, being 7½ feet in girth at 3 feet from the ground. Is it not distressing that this should be the inner state of a comparatively healthy-looking Beech tree?—A. Kingsmill.

[The trees are infested with the white bug which does so much harm: a tree of the chalky hills and dry limestone soils, the Beech is not at home on the clays of North London.]

SONGS OF THE WOODS AND FLOWERS: Daffodils.

I question with the amber Daffodils,
 Sheeting the floors of April, how she fares;
Where King-cup buds gleam out between the rills,
 And Cellandine in wide gold-beadlets glares.

By pastured brows and swelling hedgerow bowers,
 From crumpled leaves the Primrose-bunches slip,
My hot face roll'd in their fair-scented flowers,
 I dream her cheek rests against my lip.

All weird sensations of the fervent prime
 Are like great harmonies, whose touch can move
The glow of gracious impulse: thought and time
 Renew my love with life, my life with love.

When this old world new-born puts glories on,
I cannot think she never will be won.

—Lord De Tabley.

FLORA

AND SYLVA.

Vol. III. No. 26.] MAY, 1905 [Monthly.

THE WOODLAND GARDEN.

I HAVE lately seen woods of singular tree beauty in several country places, woods with all the natural advantages of soil, air, and country, and well-placed near the house—a charm which does not always occur. In these places there was all the dignity and grace of tree-life that could be desired—the trees planted with loving care by past owners; but very often such woodland is neglected until ugly plants take possession, such as Nettles, Dog's Mercury, and, most hateful of all, the common Elder and Privet.

In such woods covert is rightly sought for game, shelter, and other ends, and there is no reason why it should not take a beautiful form and be free of the enemies just named. There are no situations about a country house that offer such opportunity for beauty as these woodlands, where we can mass and enjoy many of the most beautiful of native and other shrubs, for which there is not always room in the garden. They would be far better in the woodland garden than in the usual mixed shrubbery; and good wholesome undergrowth does not interfere with the trees but rather helps them, whereas the growth of weeds and grass, often allowed to rankle over the ground, is hurtful in many ways. It is the nature of some of the finest natural woods to have an undergrowth of evergreen shrubs, as for instance in the Californian forests with their beautiful undergrowth of evergreens, the trees rising with clean stems far above them.

The first essential in such clearings would be to get rid of the covert enemies by light grubbing, and plant in bold free masses things that will fight the weeds. I know nothing that clears the ground below it more thoroughly than the Red Dogwood, its foliage is so close. A cheap shrub, it gives bright winter-effect in marshy or wet places beside streams and ponds, but it will also grow apart from water.

Our native evergreens, *e.g.* Holly, Box, and Yew—how much more beautiful and effective groups they make than the weedy trees which usually have possession. The common evergreen Barberry from North America is a beautiful covert shrub, with its foliage all through the winter and its fragrant and effective blooms in spring, but it should be held together in natural masses, and close enough to keep the ground clear. The too common way of having a lot of coarse Laurels and clipping them down to one level, is stupid and ugly, because there are so many things that give a very fine undergrowth without clipping. Take for example the large Partridge-berry (*Gaultheria Shallon*) of North America, as it may be seen at Coolhurst—what an excellent undergrowth it makes, and yet how little grown.

Evergreen Barberries might alternate with our common native Barberry, which is such a brilliant thing in fruit, and wide masses of Aucuba and Yellow Azaleas, which are now so easily raised. Such excellent evergreen covert plants as Cunningham's White Rhododendrons should be used, and they can be bought on their own roots. Rhododendrons are a host in themselves, but there is too much of the dull *ponticum*. We should encourage the bright-coloured kinds such as *Jacksonii*, and never put in a grafted plant. There are splendid kinds in the country if people will only layer them, or even allow them to layer themselves as they often will when let alone in a wood. Kinds good in colour can be picked out in flowering time at the lowest rate the nursery trade offers. Only hardy things will be used, and in southern places we might have a little more variety of evergreen undergrowth. Some of the new Bamboos would help very much for effect, such as *palmata*, which keeps the ground clean and is very fine in character. In open and poor soils the Heaths would tell well, such as the Cornish Heath, and the Common Heather in its stoutest varieties. Sweet Briars, Wild Roses, and Brambles, would naturally be welcomed, and it would be well to encourage native bushes like Viburnum, Sloe, and the beautiful Spindle Tree (*Euonymus europæus*), and plants such as Solomon's Seal and the Ferns, which often form a pretty undergrowth in woods. Wherever natural covert exists, as it often does in large woods—that is to say, tall evergreen Sedges like *Carex paniculata*, or handsome masses of Bracken or Brambles—they should be carefully kept, as there is no better covert.

As regards the time for doing the work, the planting had better be done from early autumn until March or April, but much may be done throughout the year in clearing the ground and getting rid of objectionable plants. That is even better done in summer, as we are then more certain to make an end of them than if we do it in winter or autumn. When planting Holly in rabbity places it will be necessary to wire, and if we plant in large, bold masses as we always ought, the wiring is easier. Happily rabbits do not attack Box, which is a great gain when seeking covert for hungry soils or poor dry bluffs.

It is important in such woods to have the rides airy, clear, and green, and not less than 18 feet wide. In dry places there is little to do but clear them, but in wet soils it may be necessary to form a dick on each side, the soil from which should be thrown up to make the rides drier; these dicks to be outside the 18 feet line. We lose nothing by having such rides, because the trees enjoy the soil and the best timber often comes alongside them. Much can be done by seeds sown direct on the ground, even without covering. I raise acres of Broom and Furze by simply throwing the seed out of hand. In freshly cleared spaces these seedling plants would come more freely still, and the seed should be sown not too early in the spring. I mean it is better to sow in the first week of May than in March, as it gives the rabbits a little less time to gnaw the small plants before they get well started. At least two kinds of Broom and two kinds of Furze are excellent to sow in this way, and not a few other things might be raised from seed in case of scarcity of plants; but most plants good for the work are to be had in forest nurseries in quantity, and only young healthy plants should be bought for this purpose.

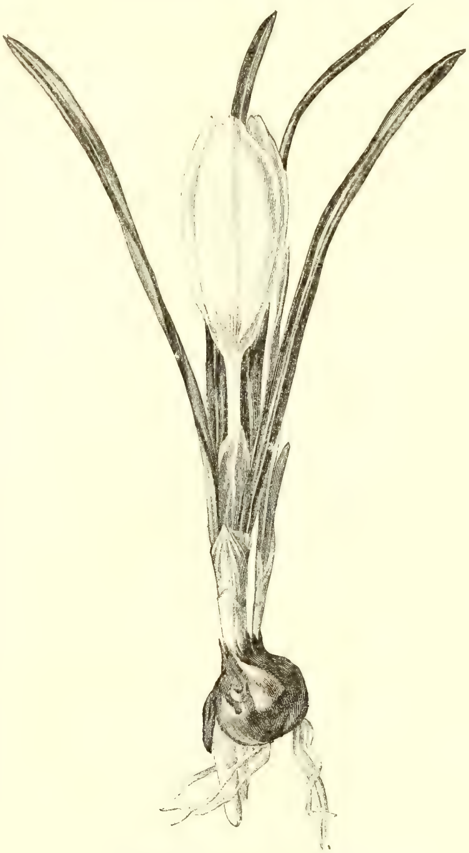
* * *

A Winter-flowering Tree (*Prunus Davidiana alba*).—One has read with pleasure your appreciative note in the April number of Flora upon this beautiful tree, which is one of the most precious things in one's garden at the early season at which it blooms. With me, in the South of Scotland, it usually does well, and I have occasionally had it in bloom early in January. Unfortunately, it sometimes has its earliest blooms cut by severe frost, but as they are not all produced at once the later flowers have a better chance of coming to perfection. This year it did even better than usual, although a little later, and one was delighted with its beauty, the slender branches being wreathed with pure white blossom in February and part of March. There are two forms of the white-flowering one, that here being the more erect, or fastigiate form, the better of the two. What I understand to be the typical form with rose-coloured flowers is not so pretty as the white one, but it, again, has been finer than usual this season. I have had both forms here for several years and have found them quite hardy in this garden by the Solway.—S. Arnott.

Carsethorn, Dumfries,
Scotland.

TWO RARE CROCI (*Crocus caspius* and *C. dalmaticus*).

Crocus caspius.—A beautiful autumn-flowering species, belonging to that group of the genus with membranous corm-tunics and without a basal spathe; it is therefore nearly related to *C. Tournefortii*, *C. Boryi*, *C. veneris*, and *C. lævigatus*, but can be easily distinguished from them by its entire stigmata and yellow anthers, for in each of these others the anthers are white and the stig-

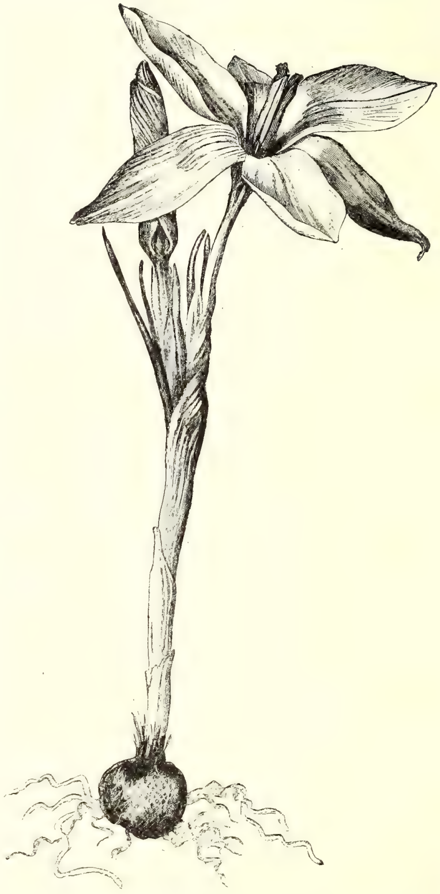


Crocus Caspius (*Fisch et Meyer*).
Engraved for "Flora" from a drawing by Mr E. A. Bowles.

mata branched. Although discovered by Hohenacker in 1838 it was not until the year 1902 that it was introduced to cultivation, as reported in the *Gardeners' Chronicle* of 26th December 1903. It was collected in Russian Talysch, at the comparatively low elevation of 1,000 feet, growing in the shade of low bushes. At first it promised to keep up its reputation of having the longest flowering period of any known Crocus—from September to March; but now that it is settling down it is becoming a late autumnal flower, and almost all of mine showed bloom this last season before December. It has proved hardy in sheltered nooks in the rock-garden here, but I have kept the greater part of my stock in a cold frame, where the large flowers open freely and last longer than those of most Croci.

The typical form is pure white with a rich orange throat, but the flowers vary much in the amount of orange appearing externally; in the var. *lilacinus* the segments are of a delicate rosy-lilac shade, unlike that of any other Crocus. For pot-culture in a cold frame or Alpine-house, it is a very valuable plant, flowering during late November and early December when flowers of that class are few. It appears to possess a vigorous constitution and should take the place of *C. Boryi*, which, owing to its delicacy, has almost disappeared from English gardens. In the engraving the corm-tunic appears as though of fine parallel fibres, but this is the result of the method employed, the living tunic showing a perfectly smooth membrane of reddish-brown colour.

C. dalmaticus.—One of the earliest to bloom of the vernal species; by mid-January I generally have its first flowers open. It is unfortunately a very rare plant in English gardens, though possessing a good constitution and seeding fairly well. The plant generally sold as *dalmaticus* is the Dalmatian form of *C. biflorus*, rightly known as var. *Weldeni*—a mistake that can be easily detected at any time, for the true *dalmaticus* has



Crocus Dalmaticus (*Visiani*).
Engraved for "Flora" from a drawing by Mr E. A. Bowles.

a tunic of very coarse reticulated fibres, and *Weldeni* of smooth, shining, hard membrane, with the rings at the base that characterise the section *Annulati*, to which it belongs. Dean Herbert ranked *dalmaticus* as only a variety of *C. reticulatus*, but the absence of a separate basal tunic, its greater size, the absence of decided featherings, and its reproducing itself quite truly from seed, are sufficient reasons for classing it as a separate species. I have it in three distinct forms, that illustrated, in which the flowers are of a cool lavender grey externally, with the inner segments slightly rosy and both inner and outer surfaces marked with fine lilac veins, which might be called stellate in form. Another variety has the outer surface of the outer segments of a pale straw colour, and is decidedly globose in form; the third is of a very lovely rosy-lilac shade, becoming almost white near the yellow throat, but this is less robust and increases very slowly. I have never seen any so distinctly feathered as that of Maw's fig. l.b. Plate XXXIV., nor the white form he mentions from the island of Lesina.

E. AUGUSTUS BOWLES.

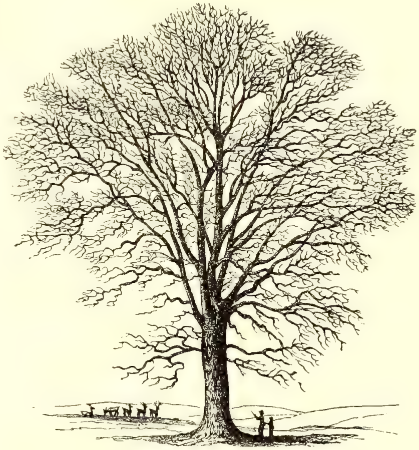
Waltham Cross.

Early Flowers.—Both the Shortia and Carpenteria seem always quite happy with me here, on Harrow Weald, as does also the sweet little Epigea. This lovely day (8th January) I picked ten fine blooms of *Iris stylosa*, just opening, making over sixty so far. But I could not harden my heart to gather the few brilliant flowers of Cyclamen Coum, which the sun had coaxed out in their sheltered corner of the rock-garden, where they lay glowing like rubies and too plainly rejoicing in the sunlight for me to think of cutting short their enjoyment.—A. Kingsmill.

THE GREATER TREES OF THE NORTHERN FOREST.—No. 26.

THE DURMAST OAK (*Quercus sessiliflora*).

Botanists often class as mere varieties of one another, things that may be totally distinct from a planter's point of view. They do not always know in a living state the trees which they see as dried specimens only, and without knowledge of the wood, habit, stature, and other characteristics which are far more essential for us than any technical description of leaves and stamens. This has been the fate of our Durmast Oak, and the result of failing to keep it apart is, that the matter relating to our Oaks is so much mixed and interwoven, that it is not easy to gather reliable data, especially where forestry has been so much neglected as it has been in this country.



The Durmast Oak.

The Durmast Oak is a noble tree, one of the greatest and most stately of those known to us. Compared with the

Common Oak of our heavy Wealden lands, the stem is more erect, more cylindrical, and while less branching produces a greater proportion of heavy branches, which are freer and less twisted. The foliage is easily known even at a distance by its deeper green colour, more even distribution, and greater density, while the entire tree is often more lofty, and with a more regular and compact outline. The leaves are larger and hang more loosely upon their longer foot-stalks; they also last a little longer than those of the Common Oak, and saplings (particularly in sheltered places and in mild winters) often keep much of their green foliage until the new leaves come. Even when naked the tree may be known by its fuller leaf-buds, its own way of branching, and its whiter bark, and in autumn by its stemless clusters of acorns.

Area. Its area is much the same as that of the Common Oak, but, while it is more restricted to the north and east, it reaches much further south as the "White Oak" of the Mediterranean region, where it thrives on the northern shores but does not extend into Africa. In the north it covers parts of Scotland and deflects thence more or less regularly eastward to the Volga, and from there curves sharply across to the Crimea and Asia Minor. It abounds in various forms throughout the south of Europe, being found at heights of 4,000 feet in the mountains of Corsica, nearly 5,000 feet in the Pyrenees, and an even greater elevation in the south of Italy, where it is abundant in the form of pure forests—as upon the slopes of Mount Etna. The great Oak forests of France are largely of the Durmast Oak, especially the famous truffle-forests of the south-east.

Soil. But while the Common Oak is a tree of the great plains and valleys, the Durmast Oak clings to the hills, plateaux, and mountain spurs, ascending high enough to be found among the Pines, and this, not because it is hardier than the great Oak of the plains, but more resistant to a dry atmosphere and poor soils. The moist, stiff soils that suit the Common Oak, are quite unsuited to the Durmast Oak, which seeks light, gravelly, sandy, or rocky soils, with a certain quantity of clay to secure the moisture which is indispensable to it. It is not so happy upon chalk or limestone, but though uncommon, it flourishes in the neighbourhood of London, where layers of clay alternate with beds of gravel. As regards temperature there is little difference between the two trees, although its more restricted northern range presumably makes the Durmast Oak less fitted to resist severe cold. On the other hand its power of resisting a dry climate carries it considerably further south than the Common Oak.

Wood. The bark varies much according to the quality of the wood. If this is supple and of rapid growth, the bark is hard, blackish, and much ribbed broad and lengthways, becoming ultimately very thick, but if the growth is delicate and slow, the bark is thinner, yellowish-brown, and finely ribbed, with an outer layer of corky matter which is apt to scale off. The Durmast Oak yields richer tan than the

Common Oak, and a charcoal of better quality, while as fuel it is found to burn with fewer sparks. Though the structure of the wood is the same in both kinds, authorities differ as regards their value, and while in general that of the Durmast Oak is rather less dense and compact, even an expert finds it difficult to pronounce with certainty as to the two kinds, which are used quite indiscriminately, their qualities depending less upon any difference of kind than upon the influence of soil and conditions of growth. In the main the wood of the Durmast Oak—which is oftener grown as a high tree—is less rigid and tough than that of the Common Oak, grown in the plains on fertile soil, and as a rule among underwood. On the other hand the wood of the Durmast Oak is less knotty, is straighter in fibre, and truer and softer in grain. Being also of lighter colour it is preferred for cabinet-work, and as of quicker growth, straighter stem, and better adapted for growing in close order, it is far more profitable for the production of timber.

Flowers and Acorns of the Common Oak.

The Durmast Oak: Flowering and Fruiting Twigs and Acorns.

General Features. While in general not so long lived as the great Oak of the plains, its trunk is less subject to decay; from its later leafing the tender shoots are seldom injured by frost; and experienced foresters claim that it is less open to the attacks of the leaf-roller moth and other insect pests. With these points in its favour it would appear strange that the Durmast Oak has been so little planted as compared with the common kind, though in parts of the north and west, and particularly in the Forest of Dean with its rocky subsoil, it is more abundant. But as a fact trees are not easy to obtain, for whereas most firms offer the two kinds in their trade lists there is hardly a grower that ever keeps them apart or can guarantee a stock in any quantity. The true way would be to gather one's own seed from selected trees of the Durmast Oak, on which the acorns ripen a few weeks later than on its rival, and to plant suitable land as pure Oak-forest. As has been abundantly proved upon the continent, conditions would soon tell in favour of these young seedlings, their thicker and more lasting canopy, quicker and more erect growth, and the richer deposit of humus formed beneath them, are gains that soon make themselves felt in forest growth, and even if injured by rabbits or otherwise, the Durmast Oak will often spring again from the root. And though the planter might not himself reap the reward, he would leave a rich inheritance to his successors, as the result of his patience and foresight.

Management of Oak Woods. Such Oak forests as are seen in Central France and other parts of Europe, are (as regards the State forests) usually worked on a rotation system of from 150 to 200 years, sometimes even 250, or in fertile soils even 300 years, but this last is much too long, and in principle the best way is to fell the trees as soon as they attain maturity. The guiding principle in thinning should be to leave just sufficient canopy to keep the soil cool, fresh, and clean; more shade will endanger the existence of the young Oaks, whereas with too much sun the soil becomes hard and covered with weeds. Thinnings for improvement should be frequent and systematic, the first at 7 or 8 years, the second at 14 or 15, and at about the same season. At 20 years a third thinning should be made, while from the twentieth to the sixtieth years there should be at least one thinning every 10 years. Natural resowing has its advantages, by preventing irregularity in the mass, and exhaustion of the soil by washing and drought. It also economises seed, and the cost of preparing the ground.

References.—Loudon, Arboretum, vol. 3, p. 1736; Selby, Forest Trees, p. 246; Mathieu, Flore Forestière, p. 353; Boppe and Jolyet, Les Forêts, p. 56; Mouillefert, Essences Forestières, p. 70; Laslett, Timber Trees, p. 92; Forbes, English Estate Forestry, p. 67; Woods and Forests, p. 10.

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NERINE, WITH A PLATE OF NERINE BOWDENI.*

A group of tender bulbous plants from South Africa, often with brilliant flowers of varied colour, and all of elegant form. There is a strong likeness between the different kinds, and the plate of *Nerine Bowdeni* shows well what others are like. There is however much variation in size of flower, those of *N. Bowdeni* being among the largest, while many others come between it and *N. undulata*, which has flowers under an inch across. Another point of difference, and one which offers a good reason for their division into two main sections, is that one group (including *N. sarniensis* and *N. curvifolia*, and with mostly scarlet, rose, or crimson flowers) has the petals or segments of the flowers nearly equally rayed, while in the *N. flexuosa* section—of which the highest example is *N. Bowdeni*—the segments are unequally displayed, the majority curving to the upper half of the flower. These two sections have been partially merged by crossing, but even in the hybrids traces of these structural peculiarities remain. As regards foliage, the plants of the *N. sarniensis* group have generally broader leaves of darker or more glaucous green, and their bulbs need a more rigorous drying off than in the *N. flexuosa* section, though a definite time of rest is essential to all. Yet other differences are that the first section produce their flower-spikes from the leafless bulbs, at the end of the dry season in summer; while in the *flexuosa* class the leaves often come at the same time as the flowers, or follow them close-

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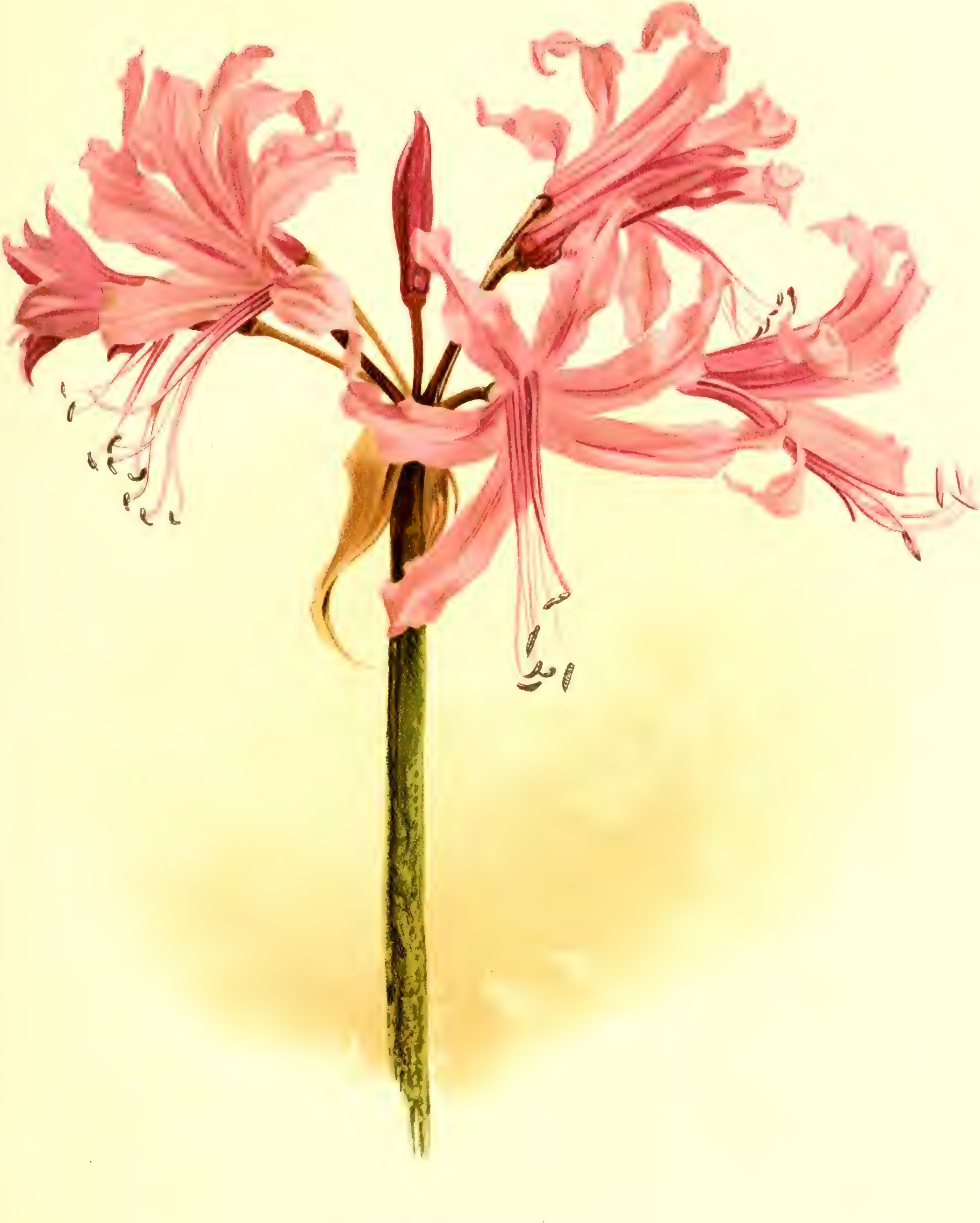
* From a drawing by H. G. Moon.



NERINE BOWDENI.

ly and before the plants are out of bloom. In all the kinds the flowers last a long time, and the plants stand very well when used for indoor decoration.

Culture. All the Nerines are from South Africa, and like other Cape bulbs of this class, they need a dry cool house or frame. When such bulbs are put into warm moist houses they cannot bloom or even grow satisfactorily, and are soon condemned as worthless. Treated as ordinary greenhouse plants, with proper seasons of rest and growth, no plants are easier to manage, and few are more worthy of care. The Nerines flower at the end of the summer and in autumn, and the appearance of their flower-spikes tell when water may be given. Up to that point they should be kept perfectly dry in a cool frame, upon an open wood-work staging, or in a sheltered corner of the open garden, under glass lights to keep off rain. They should stand in these quarters all summer, and (after the foliage has turned yellow) dust-dry so far as the most deciduous section (*N. Sarniensis* and *N. curvifolia*) is concerned, water being withheld until the flower-spikes are 2 or 3 inches above the soil. The plants may then be removed to the greenhouse, and moisture given as required. The same plan should be followed with the *N. flexuosa* section until either flower-spikes or leaves appear, when a little water should be given, for those pushing up leaves will probably flower with the foliage, and if water were withheld until the spikes appeared the plants might suffer. The aim is, not to induce leaf-growth by watering, or probably the flowers will fail, but when leaf-growth begins under these rigorously dry conditions, the plants must not suffer for want of water. During the flowering season and after the leaves appear, the plants should be freely watered and grown on like any other plant, until, by turning yellow, the leaves show that the resting season has again come round. Before this they will be again placed in the sunny frame, and from the time the leaves wither until the spikes again appear, the bulbs must once more be kept perfectly dry. Good fibrous loam with a little sand added, is the best soil, and pots should be used that seem small as compared with the plants. Repotting should not be done each year but only when quite necessary, for the longer Nerines are left undisturbed, the more freely they flower.

Outdoor Culture. The Belladonna Lily and some other Cape bulbs thrive well in the open, and there is no apparent reason why the Nerines should not do so, but although I have myself succeeded with *N. undulata* and a few others,—so far as to get them to live and flower irregularly,—and have seen similar results with others,—I have never yet found them grown with any great success as hardy plants in this country. Soil and situation have much to do with it, and the experiment may yet succeed if proper quarters can be found. Any who try to grow them outdoors should remember that deep planting gives the most hope of success; bulbs will have the best chance when sunk at least 9 inches deep, close to the foot of a sunny wall where they will not be disturbed.

Species. *N. Bowdeni.*—A very fine new kind from the Cape, the flowers of which are well shown in our plate. It bloomed last year with Mr. Gumbleton of Belgrove, Queenstown, under the name *N. excellens tardiflora;* also at Kew, and with Messrs. Veitch of Exeter, who showed it at the Royal Horticultural Society on 22nd October 1904, when it gained an award of merit. It was sent from Cape Colony to Mrs. Cornish-Bowden of Newton-Abbot by her son, a government surveyor in South Africa, who came across it in an out-of-the-way district near King William's Town. The native boys had much difficulty in getting the roots, which grow only in the most inaccessible spots among the mountains. The plants flowered in this country were in full beauty at the end of October of last year, and have rose-pink flowers with a darker line at the centre of each segment, and bright green leaves. As regards cultivation, *Nerine Bowdeni* belongs to the second or *flexuosa* group.

GROUP I.

N. curvifolia.—This kind and its forms are the finest of the genus, and in some gardens it is grown in quantity for its brilliant scarlet flowers. This plant (and those of its section) needs a thoroughly dry time of rest. Syn. *N. Fothergilli.* Plants vary in size of flower, the best being known as *N. Fothergilli major.*

N. corusca and variety *major.*—Flowers of brilliant scarlet, their segments finely waved.

N. Moorei.—Leaves bright green, much curved; flowers scarlet.

N. Plantii.—Flower spikes taller than in the other kinds. Flowers rosy-crimson.

N. rosea.—A form of *N. sarniensis*, with reddish-rose flowers.

N. Sarniensis.—The best-known species, in cultivation for over two hundred years, and so long grown in the Channel Islands as to have taken the name of "Guernsey Lily." Flowers bright rose.

N. venusta.—The smallest of its section; flowers scarlet.

These form a distinct group, and (botanically) may be related to either *N. sarniensis* or *N. curvifolia*, but to keep them separate is best for garden purposes.

GROUP II.

N. angustifolia.—Inflorescence of 2 feet or more in height, and pubescent even to the ovaries. Flowers pale pink with a darker line in the segments. Orange River Colony.

N. appendiculata.—A slender species introduced by me from Natal. Narrow, bright-green leaves a foot long, and flowers of reddish-pink.

N. filifolia.—A small species with slender green leaves and umbels of red flowers.

N. flexuosa.—A strong grower, having broad bright-green leaves, and flower-spikes often 2 to 3 feet high, bearing white or pale pink flowers with crisped edges.

N. flexuosa alba.—Flowers of pure white.

N. humilis.—A very pretty and variable species, with crisped-edged flowers in various shades of rose colour.

N. pancratioides.—Akin to *N. appendiculata*, with white or pale pink flowers showing a rudimentary corona at the base of the segments. Imported by me from Natal.

N. pudica.—An elegant little species bearing white or pink flowers, marked with a narrow rosy line in each segment.

N. pulchella.—Allied to *N. flexuosa.* Leaves dark green and of firm texture; flowers larger than in *N. flexuosa*, pale pink with a rose keel. The variety *N. Sandersoni* is a robust form of this with less wavy segments to the flowers. Transvaal.

N. undulata.—One of the smallest species, often seen in gardens as *N. crispa.* Flowers whitish or pale pink. The variety *major* has larger and darker flowers.

Two species, *lucida* and *marginata* I regard as doubtful, though received by many botanists. *N. lucida* (figured in Bot. Reg. t. 497 as *Amaryllis laticoma*) I have never seen except in dried form. *N. marginata*, which I lately received from its recorded habitat with a faded inflorescence still on the bulb, is, I believe, really a Brunsvigia.

Hybrids. Nerines cross and bear seed abundantly, the seeds being fleshy and bulb-like. They germinate freely, making bulbs more quickly if sown on the top of the soil than when covered. Many years ago Dean Herbert raised several hybrid Nerines, but little was known of garden hybrids in our time until about thirty years ago, when I raised some thousands of seedlings from various crosses. The best of those named were *N. cinnabarina* (*curvifolia major* × *flexuosa*), a large-trussed brilliant cinnabar-scarlet; *N. atro-sanguinea* (*Plantii* × *flexuosa*), the best of the dark crimson hybrids; *N. Manselli*, with very broad green leaves and lilac-rose flowers; *N. elegans* (*flexuosa* × *rosea*), which is the same as *N. excellens* for which *N. Bowdeni* was at first mistaken; and *N. O'Brienii* (*pudica* × *Plantii*), whose flowers vary from carmine to pale slate-blue, the variation having set up a number of synonyms. Herr Max Leitchlin, Sir Chas. W. Strickland, and others, have worked in the same field, and especially Mr. H. J. Elwes of Colesborne, Cheltenham, who has raised many new varieties which have received awards at the Royal Horticultural Society. Mr. Elwes aims at a late-flowering strain which shall produce flowers and leaves together, and has already done much in this direction.

JAMES O'BRIEN.
Harrow-on-the-Hill.

THE CITY EVERGREEN.—One of the most pathetic things in a great city is an evergreen shrub which, planted within a black iron railing just outside some fashionable drawing-room window, seeks to wear out its wretched life in that prison. Just above it, perhaps, in a square decorated box are Hyacinths in spring or white Begonias in summer; and every morning some fair jewelled hand, or perhaps the white, pure finger of a child, is stretched out shyly to give them the little water that keeps up their artificial life. No face bends over them, no one heeds that poor shrub. With dry, sapless roots, tainted and blackened leaves, it looks wearily at the sun, until, as in a kind of leprosy, leaves drop and wither, and fall down; then the wrinkled little branches become dry sticks; and one day it is seen that only a blackened skeleton remains. It has pined for its forest life, for winds and rains, for the soft burden of the snow, for the pleasant but hurried visit of the blackbird or thrush, perhaps for the soft nest where the young of both are laid. It is an exile in this wilderness of brick. It eats out its heart and—dies.—SHEEHAN.

THE GIANT REEDS (*Arundo*).

WHAT the Bamboo is to the tropics and the far East, the Great Reed is to the region of the Mediterranean, giving good effect in the landscape and valued for its many uses. The stout canes serve the peasant of southern Europe in a variety of ways. Woven in trellis they enclose his little garden-plot and carry his Vines and Gourds, his Beans and Tomatoes; from them he constructs his summer "abri" thatched with Palm-leaves, with them he beats his little Olive-grove, and upon them he spreads his Figs to dry for winter; they give him his fishing-rod, the handles for his lighter tools, and even his tobacco-pipe, and to the good-wife her homely distaff. Their clustered growths shield his little holding from the biting *mistral*, while from the split wood of their ripened stems are woven the baskets which carry his early flowers to the markets of the north. His goats and his mule crop the first tender shoots, and in the heat of summer the whisper of the breeze in their swaying thickets refreshes the spirit like the sound of the rushing waters that come down from

THE GIANT REED
(*Arundo Donax*)

the hills. Journeying to the Mediterranean by the valley of the Rhone, they greet the eye with the earliest signs of southern vegetation; when the first little rounded Olive-bushes begin to stud the warmer slopes, when the black Cypress appears here and there in the landscape, then the Great Reeds begin to rise and thicken upon the river bank and beside the water-courses, till as one nears the sea they spread into wide belts of waving grey, shutting in the river between living walls as instinct with life and motion as the hurrying flood itself. They gave the name to many a little sun-bathed town and village as in Cannæ, Cagnes, Cannes, Cannossa, and, in far-off days, Cana—of Galilee—this "reed shaken by the wind" thriving throughout Syria and all down the valley of the Jordan. Through many generations the Great Reed has played a part in the daily life of the ancient world, from the days of the early hunters and the classic warriors of old, till reed-pipes heralded the dawn of a more pastoral age, and later still the husbandman learned to adapt it to the arts of peace.

While they may never serve us in these rough-and-ready ways, the Giant Reeds give distinct effects in the warmer parts of Britain, and if not hardy in all winters they are sufficiently so in the best soils to be a valued addition to our southern gardens. While most luxuriant at the waterside or in damp spots, such places are against them in severe winters, while they often refuse to thrive in heavy ground though happy in warmer soils within a short distance. Where it is possible to water freely during summer, or to irrigate by a trickle which can be cut off in winter, the plants will go to rest more fully and prove more hardy than on damper ground. Though the genus is not a large one, the seven or eight species are spread over a great part of the world, with one kind, the handsome Flowering Reed of New Zealand, confined to that country. Apart from their distinct beauty of form few plants make better covert for game or waterfowl, all kinds being useful in this way, from the Common Reed of our country (*Arundo Phragmites*) to the Great Reed, or even *Arundo conspicua*, the drooping leaves of which form a jungle of dense cover beside the lowland streams in its own country, and are yet so rigid as to turn cattle when thickly massed. By the latest ruling this plant is removed from *Arundo* and joined to the Pampas Grasses as *Cortaderia conspicua*, but the change is so recent and the plant so familiar under its old name that to omit all mention of it in this group might puzzle not a few, who are more at home with the living plants than with technical details. The plant certainly resembles the Pampas Grasses so nearly in general effect as often to be confused in gardens, but apart from the much earlier flowering of the New Zealand Reed, it may easily be told by its dwarfer and less rigid habit, leaves broader and less sharply toothed, and the looser flower-spikes which rise upon slighter stems high above the foliage, the plumes as beautifully curved as an ostrich-feather, with the silvery glumes drooping gracefully to one side. The plant is not quite so hardy or so vigorous as the Pampas

Grasses, and is perhaps for this reason more fastidious as to soil, but it is worth trying in all the warmer gardens of our land, and in tubs for house and conservatory decoration where the winters are too severe in the open.

THE GIANT REED (*Arundo Donax*).—A noble grass upon warm, good soils, seen at its best in the west and south-west of England in rich ground beside water, and protected from wind. Even then it suffers from time to time in severe seasons, and should have a covering of dry ashes during winter, while its own stems form a natural protection. For the sake of neatness they are sometimes cut down in autumn, but this is a mistake as they should remain till the young shoots have started freely in spring, and may then make way for the new canes. In the south of Europe where the plant often covers much ground, the plan is to cut the old canes in spring and set fire to the stumps, thus clearing and manuring the ground at the same time. It is useless to leave them longer than one season, for in their second year the old canes throw only side-shoots which may be taken off and rooted by way of increase, but are far less handsome in effect than the new canes with their broad, grey-green leaves and swaying stems of 10 to 12 feet. They should be grouped together to produce the best effect, and large tufts of this height may be grown in three or four years, while in parts of Devon and Cornwall canes of 15 to 20 feet are grown rivalling those of the Mediterranean. Though less tall near London, fine tufts may be seen at Syon House, and elsewhere upon the lighter soils of Surrey, Kent, and Sussex, those at Arundel being especially good. On cold and heavy soils the plant is tender and does not thrive. Even in its own country *Arundo Donax* is uncertain as to flowering, and in this country its purplish plumes are rarely seen save in a hot season such as produced 40 spikes of flower upon a fine plant near Frome some years ago. Though from time to time they flower with unusual freedom in the south of Europe, fertile seed is not often produced, and this abundance is taken by the peasants to mean a severe winter to follow. The canes are more glossy than the Bamboo, with persistent leaf-sheaths, and while so flinty as to turn the blade of even a good knife, they are less strong, splitting easily and sometimes doubling up between the joints. In addition to two forms which we shall describe more fully, there is one known as *macrophylla* or *glauca*, in which the leaves are larger, prettily drooping towards the tips, and conspicuous at a distance for their distinct shade of bluish-green. Increased by division, by layers, or cuttings of the tender side-shoots.

VARIEGATED GIANT REED (*A. Donax versicolor*).—A handsome plant in which the leaves are so boldly striped with white or yellow that little remains of the original green colour. It is less hardy than the parent, and while effective in colour is far less stately, often not exceeding 2 to 3 feet in height. Even in the south of Europe this kind does not flower, but is used in tufts for the centre of flower-beds, or apart upon grass. It only thrives in gardens south of the Thames and in warm sandy soils, with root-protection in winter. A dry, well-drained place is best, giving abundance of water during summer; when established avoid moving, as dangerous to the plant if followed by a sharp winter. Easily increased from old stems placed in the tank of a warm house; young shoots start from every joint and may be rooted in gentle heat.

FLOWERING REED OF NEW ZEALAND (*A. conspicua*).—A noble flowering Grass, the effect of which is well shown in our engraving. When established it blooms very freely, throwing low broad tufts of fountain-like effect, with flower-stems of 8 to 12 feet high while large plants often measure nearly as much across. Balanced upon tall and slender stems the plumes dip and sway in the breeze most gracefully, and when in masses of 60 or 70 are seen for a distance. Open early in July in a warm season, this Arundo may be enjoyed in full beauty for weeks before the other Cortaderias come into flower, and its looser plumes hold so much less moisture that they are less easily broken and often outlast the Pampas plumes, which only expand as the autumn storms are upon them. Even with careful planting, several years elapse before plants that have been moved will flower, so it is important that the place should be well chosen in the warmest part of the garden, and the ground carefully prepared. It is seen at its best only in good and deep soils, apart upon lawns, or grouped upon dry banks where there is nothing to fear from stagnant moisture. Even with protection at the root, very severe winters are sometimes fatal to it upon cold soils, but under glass the silvery plumes will last for nearly a year and such pot-plants may be used with the best effect in rooms and entrance-halls. Increase by seed or division, using good loam or peaty soils, with abundance of water during summer. This beautiful Reed is found only in New Zealand, growing in wet places, where it was found by the botanists accompanying Captain Cook on his first voyage. In former times its leaves were used by the natives in weaving a coarse matting with which they lined the walls of their huts.

GIANT REED OF PROVENCE (*Arundo gigantea*).—A fine grass found here and there in the south of France, but nowhere common. Though classed as a distinct species by some botanists, for garden purposes it may be considered as a distinct form of *Arundo Donax*, which it equals and even surpasses in height, the stems being slighter and far more densely leaved. It flowers more regularly too than that kind, with long narrow plumes of a paler silky-grey appearing a little later. This plant thrives only with its roots in shallow water, and is found in the low marshlands between the mouths of the Rhone and the Spanish frontier, and most freely at the lakes of Salces between Narbonne and Perpignan.

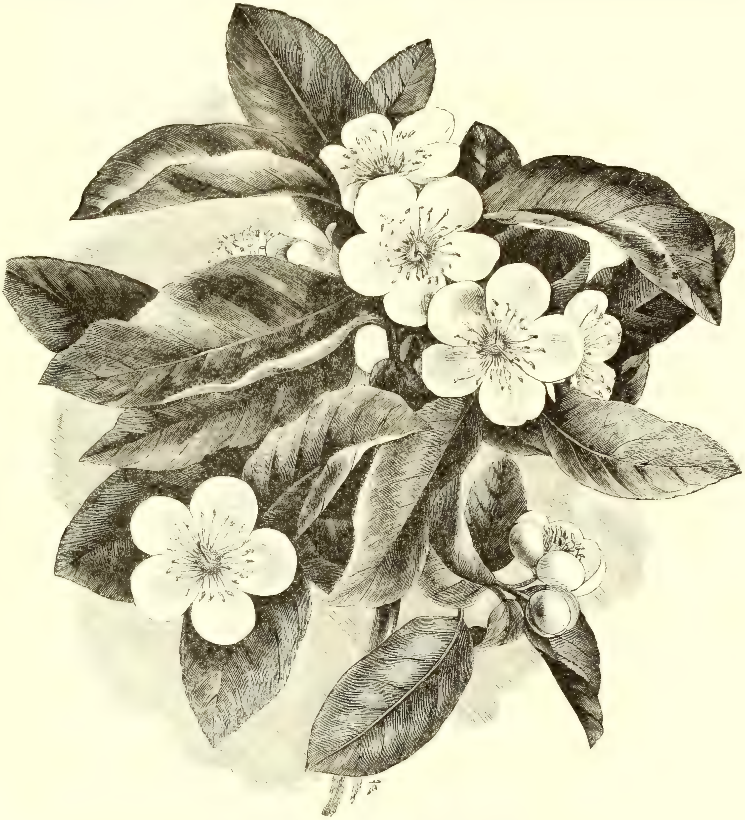
THE AFRICAN REED (*Arundo madagascariensis*).—A tall Reed from the warmer parts of Asia, Africa, and Madagascar, and consequently tender in this country. Its woody stems of 10 to 20 feet bear feathery plumes, similar in shape and texture to those of the Pampas Grass.

GREAT ALGERIAN REED (*Arundo mauritanica*).—A plant from the southern shores of the Mediterranean and in general too tender for the open air with us. It is sometimes grown with aquatic plants under glass, as in the water-lily house at Kew, but is rarely met with save in such collections. Its canes are slighter and shorter than in *Arundo Donax*, with flat leaves of greyish-green and narrow heads of flower nearly 2 feet long at their best, and stiffly rounded like a fox's brush. These plumes come later by some weeks than in other kinds, and are only seen under glass in this country, where they last for months in good condition. Tufts are sometimes planted in the open upon our southern coast, and so treated the leaves are apt to come prettily variegated with white, the normal colour coming back if the plant is again taken inside.

THE COMMON REED (*A. Phragmites*).—The tallest and most graceful of British Grasses, reaching a height of 8 to 10 feet in places and soils where it is thoroughly at home, but oftener from 4 to 6 feet beside streams or moist ditches. Its appearance is too familiar to need description, nor has the plant much to recommend it except while bearing its spreading heads of dull purple in the autumn. Growing thickly on the margin of large sheets of water, its colour is then not without effect, while the tall stems afford good cover, and the roots help to fix soils that are soft or shifting. A more useful plant for gardens is a finely variegated form, of good growth, and pretty at the waterside. B.

FUCHSIAS AT KILLARNEY.—The air is mild and balmy, never really cold, and the winters are such only in name; indeed, the freshness of shrub, tree, grass, and flower, all the year round, is so remarkable that spring may be said never to be entirely absent from this favoured region. The most obvious proof of what the climate is may be gathered from the Fuchias. These run wild in lovely, unrestrained riot. Not solitary plants in pots, or carefully tended and kept free from weeds in cultivated gardens, taken in in the winter and coddled up in greenhouses. Grand, freely flowering masses of bloom,—6, 10, and even more feet in height. Bushes of them as large as fair-sized Elder trees. Hedges of them—as in the Kylemore Pass—literally miles long in two converging lines of startling bright red, to drive between which is an experience alone worth a pilgrimage to Connemara. Garden boundaries marked out by trees laden with the four-petalled crimson crosses, enclosing the inner whorl of regal purple and the turkey-red stamens, glowing cheerily from every crevice in the walls and from every ditch-side.—*Good Words*.

CRATÆGO-MESPILUS (Bastard Medlar). A curious group of shrubs, raised as a cross between the Medlar and the Hawthorn, by Messrs. Simon-Louis of Metz, and what is known as a graft-hybrid. An old Medlar grafted upon Hawthorn, had been neglected until strong Thorn-suckers pushed from near the base, with the result that the sap became modified in some way leading to the formation of buds of this strangely mixed character. Taken off and grafted, these shoots retained their character, and are now in commerce under the name *Cratægo-mespilus* or Bastard Medlar. The two best kinds are *Dardari*, a vigorous shrub with the look of a Medlar and pretty white flowers, which are smaller than in the parent and gathered into heads of 6 to 12 together. The fruits are like a Medlar but much smaller and flattened, and the leaves are unlobed and either smooth or minutely toothed at the edges. The second kind, *Asnieresi*, takes us a stage nearer the Thorn. It is a spiny shrub with rough dark stems and down-covered young shoots, while the leaves are also downy, and lobed more or less like those of a *Cratægus*. The flowers are greenish-white changing to pale rose, a little larger than in the Hawthorn, and gathered into dense heads upon stems clothed with white hairs. The fruits are like a Haw in shape and size, but brown, and covered with down.



Smith's Medlar (*Mespilus grandiflora*).

Long before this, however, there was a hybrid form known in England, which, though not much planted of late years, is not uncommon in the neighbourhood of London and even in the London parks. This is *Mespilus Smithii* or *M. grandiflora*, a medium-sized tree with a rounded spreading head, hardy, and not without beauty, though, like many hybrids, not, perhaps, quite so beautiful as either of its parents. The lower branches droop gracefully, making an effective lawn-tree when thickly studded with its large white flowers over an inch across. They usually open during May, but come even in April when the season is early, either singly or in clusters of threes (in which the flowers open one at a time so as to still appear solitary), and fading away with a rosy tinge. The fruits are like those of the Thorn, indeed, except while in bloom, the tree is hardly to be known from a Thorn-tree. Its precise origin has long been in dispute, for, while it has been found wild in the mountains of the Caucasus, it is also said to have occurred in various parts of France as a natural hybrid, and to have been produced by artificial crossing also.

The above very awkward name is an example of the perverted inventiveness of persons of botanico-technical mind, and shows little evidence of poetry or grace. The invention of such names for any reason is not a thing one should be proud of, and is indeed a nuisance. Nor is it right even from the point of view of botanical terminology, as it would surely be much better to class such hybrids under the natural species which they most resemble. In this case we should group them as forms of the Medlar, or hybrid Medlars.

THE CHINESE CHESTNUT

(*Xanthoceras sorbifolia*).

Thirty years have passed since seeds of this little tree were first distributed in Europe, but it is still uncommon in gardens, though oftener seen in collections of forced shrubs. Nor is it common in its own country, Chinese Tartary, where it makes a tree of about 20 feet, with an erectly-branching head, and somewhat suggestive of a Chestnut in general appearance. Abbé David, a French missionary, sent seeds to the Museum of Paris in 1868, and though the young plants grew well, all attempts to increase them failed until fruit ripened in 1874, when it was found easy to do so. Though hardy in our climate it is not happy in all gardens alike, growing best in a light soil, with a sunny aspect, and some shelter from cold winds. Its own country is far colder than ours in winter, but, when the frost once breaks, it gives place to a genial and constant warmth, so that growth is maintained without a check: to plants from such a climate the constant changes of our spring months are a severe trial, and it is the cold days of May after growth has well begun, that often spoil its charms, and this must be borne in mind when planting. A second point is that among seedlings there are inferior varieties with small and dingy flowers, so that it is well to select plants while in bloom, for their beauty and size of flower.

When suited as to soil and surroundings few shrubs bloom more freely even while quite small, growing as a little tree-like shrub with stout, straight branches, and coming into beauty during April or May. The leaves are of bright green, 8 to 12 inches long, and cut like those of the Service Tree into coarsely-toothed leaflets. The flowers appear with the opening leaves, in dense spike-like clusters of 4 to 8 inches or more, the blooms about an inch across, composed of five crisped, creamy-white petals, opening with a greenish tinge at the base which deepens with exposure to copper-red, and then to deep crimson or violet-purple before fading. Perfect and imperfect flowers occur on the same plant. The finest spikes of flower are always at the tips of the shoots, the side clusters coming smaller. It will be found that whereas these fine terminal clusters contain perfect flowers, the smaller side-shoots bear only sterile blossoms in which the pistils is undeveloped. There are often a few sterile flowers at the base of the perfect clusters, or a few perfect flowers at the tips of the side clusters nearest the top, but fruits are very seldom produced by any of the side shoots owing to this strange fault in the flowers. The flowers are of no use for cutting but are very beautiful, coming so freely upon the branches that more than a hundred large clusters may often be found on little shrubs of only a few feet high.

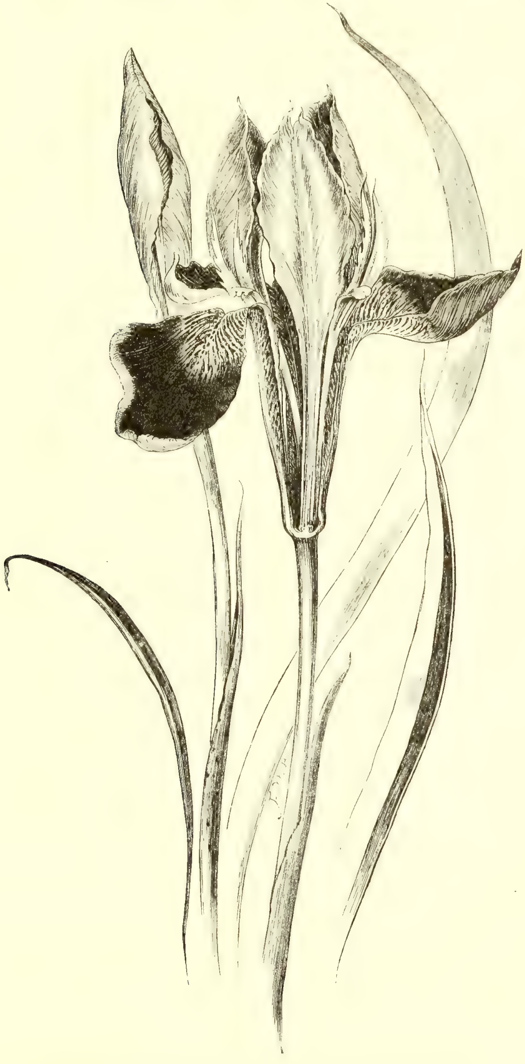
The plants do not fruit at all freely except in good seasons. The fruits swell to the size of a little angular Apple or Pear (and may resemble either one or the other in shape), with a rough pale-green husk which when ripe splits downward from its pointed tip into three parts, like a Horse Chestnut, showing brownish-purple seeds which are nearly half-an-inch across. The Chinese eat them, and grow the tree for this purpose; in our country their only value is as a means of increase, there being no other method but root-cuttings taken just before the plant starts into growth, and these do not always succeed. The fruits ripen towards the end of July, coming mostly in bunches of 3 or 4 upon a thick, fleshy stalk, though occasionally as many as 6 or 7 form in one cluster. When planted in favourable conditions the scattered seed often comes up around the parent in the open border, providing a supply of young plants ready to hand.

The Xanthoceras is a slow grower and averse to removal, making only a few stout roots which run deep. It is doubtful whether it will ever reach full size in this country, the largest tree so far being about 14 feet high and as much in diameter. This fine plant is about 26 years old and is growing in light porous soil and quite an open position in the gardens of Offington Park, Worthing. It fruits very freely in good seasons having borne clusters of 6 or 7 fruits together a few years since, while Mr. Gaisford tells us that the tree is full of flower-buds at the present time. There is a second plant almost as fine in the same gardens, but this one has the protection of a greenhouse. An old plant at Kew has reached the top of a 12 foot wall and would grow somewhat higher if allowed, but its way of branching is too stiff to make it a good wall plant. Other fine trees are at Richmond, the Victoria Park—Bath, at Totteridge, and other places of warm, light soil, while a fine tree of 10 feet growing at Lewes has recently died. It is not a common tree in the south of Europe, where the long summer drought is against it, but a few fine ones of nearly full size may be found here and there in moist places, and beautiful groups have been formed in the gardens at Monte Carlo, showing how well it lends itself to grouping, when in the best conditions. In our country it is perhaps mostly grown for gentle forcing, flowering freely in pots when aided by a little warmth. After growing for awhile under glass, care is necessary when the pots are again placed in the open, or the tender leaves will suffer from wind, and whole shoots die away completely. Even plants that are well established in the open often betray this weakness, small shoots fading away quite suddenly and without any apparent cause, while full of leaf and flower.

The clumsy botanical name meaning "yellow-horn" comes from the curious little horn-shaped glands set between the petals, at their base, but the popular name of Chinese Chestnut recalls its use in the far east, as well as its relationship to the Horse Chestnuts. It is also nearly related to *Koelreuteria paniculata*, a tree of about the same height found growing with it on the plains of N. China, and with many features in common, while, like two lonely orphans associated for company-sake, neither of them possesses any near relative of its own. Though each is in a genus apart, they are members of the same order, and so nearly akin that the Koelreuteria has been used as a stock for grafting the Xanthoceras, though with little success. Though the fruits would seem to be harmless enough, the wood of the Xanthoceras is poisonous, a fact discovered by a gentleman who, on placing a few cut shoots in shallow water to keep them fresh, found that every fish in the pond died. B.

THE ALGERIAN IRIS AND ITS VARIETIES.

With our few hardy winter flowers, so good an one as *Iris unguicularis* (better known as *stylosa*) deserves a place in every garden where its needs can be studied. Nor are these hard to meet, while the large and finely-coloured flowers come freely and over such a long season that it is not rare for well-placed plants to flower for three or four months in succession, resting for awhile it may be in severe weather. The flowers are on stems so short as to be almost buried in the grassy leaves, and though this shelters them, the plant loses in effect; something may be done however to remedy this, by choice of ground, or by growing some of the newer selected varieties with short and narrow leaves. To succeed with this pretty plant it must have shelter and a warm, sandy soil. It often fails to flower when planted in the open like other hardy Iris, because its leaves are spoiled by wind, and the early buds forthwith ruined: in this way it has never a chance. Or again, it may be coddled and overfed into growing bright grassy tufts of leaf, 2 to 3 feet long, with never a flower. Commencing to bloom in November (or even earlier) and continuing into February or March, a cosy place at the foot of a wall, or a narrow border on the sunny side of a greenhouse and against its warm brickwork, is as good a place as can be found for it. True there are often other claimants for these choice corners, and in most of our southern gardens places may be found almost as good upon warm, dry banks, or under the shelter of a raised and sunny hedgerow, where its roots will be quite happy among roots and stones. There is many a wall, however, given to fruit or climbing shrubs, at whose foot tufts of this little plant would thrive. Nothing is better for it than a light granitic soil such as those of many parts of its own country, where it abounds in open places and in sandy Pine woods, or here and there (already half wild) around Cannes, where the soil is similar. It will also do well in a light limestone, but rarely thrives in heavier ground, unless well prepared by adding stones, lime rubbish, or gravel, to keep it dry. It increases fast and should be left to spread in tufts when so placed as to be well exposed to sun and light, thriving best in raised clumps, standing full sun and the fiercest drought, and often with its roots half bare. When divided, it should be in April, when the flowers are over. These blooms of pale lavender blue are 3 to 4 inches across, fragrant, and as delicate in texture as an Orchid. It will therefore be well understood that the winter winds and rough weather soon ruin the buds, unless well protected, with a tilted handlight, or a spare frame propped against it. If this little extra shelter can be arranged more naturally—as by overhanging shrubs—so much the better, and this care will be repaid by the increased size and beauty of the flowers. However well placed, the tufts will need watching for slugs and snails, which shelter in the grassy leaves and prey upon the tender buds before they open. Where the conditions are against their opening well upon the plant, the buds may be cut while still tightly rolled and will expand in water, looking very pretty in small vases, and lasting for several days in a fairly cool room. Though seemingly on stalks of about 6 inches, the " stem " is really the hollow tube of the flower, which runs down to an ovary rising so little above the ground that its seed vessels are often half-buried and quite overlooked. It frequently seeds in the milder parts of the country, and will flower from seed in two years.



Winter-flowering Algerian Iris (*I. unguicularis*).

Though *Iris stylosa* will flower well in most southern gardens of light soil, in the colder and northern parts of the country it is only satisfactory under glass, and for its long season of beauty it is worth a place in any greenhouse, flowering freely with very little heat. The bright evergreen leaves are handsome in the bold tufts which are best for pot-work, and the plants can grow in the open all through the summer. Though they may be freely watered and fed with liquid manure for a while in spring, these plants should be thoroughly ripened and left to get somewhat potbound before autumn. Rich soil or over-feeding will even throw them out of flower, and when lost the habit is with difficulty renewed, by starving through prolonged drought, or planting in very poor soil. Well-flowered pot-plants, whether white or blue, are very pretty for room decoration, but from their greater delicacy the white kind is less useful for cutting than the coloured forms. For this reason it is often planted out under glass, in the border of a cool rose- or fruit-house, flowering from December into March or April. Out of doors, several of the newer varieties bloom later than the parent, bearing larger flowers upon longer stems, and with leaves shorter and so much narrower as to show the flowers to fuller advantage. In this lies their chief value, for some of the colour variations are more distinct in name than in character. All are best in warm and open soils, flowering better, and being less worried by slugs.

Varieties. — There are several named varieties, some of which are wild forms and others seedlings raised in gardens. In the south of Europe it comes so freely from seed that varieties are numerous, two of the best being *superba* and *magnifica*, with larger flowers of deeper purple. The white form *alba*, is grown in quantity at

Hyères, and is very beautiful in midwinter. Of this pale flower there are two varieties, one of which was found growing wild in Algeria, near Mustapha, by an English resident. Its flowers are pure white, save for the bright yellow blotch in the centre of the inner segments, deepening towards the base of the claw; the segments also are narrower and even more delicate in texture than in the coloured forms. The second white variety is of stronger growth, with broad leaves of bright green, and ivory-white flowers of fuller substance. Though more robust than its purer and more delicate companion, neither of these pale flowers is as lasting as those of the wild plant. There are also a number of impure whites which do duty for *alba*. The finest coloured form is *speciosa*, with massive flowers of great substance, showing beautifully waved segments of rich violet, shaded with purple. The leaves are narrow and so short that the flowers easily overtop them, making this the best kind for garden effect though a little later in flowering. A seedling raised by Messrs. Dammann of Naples and called *Kaiserin Elisabeth* shares this dwarf form and short grassy leaves, and its flowers show a distinct reddish tinge. In the variety *purpurea* the flowers are deep purple and slightly larger, with leaves as in the parent; *atroviolacea* is another good dark form of intense colour. Paler kinds are *lilacina*, a plant of strong growth blooming early in April, with flowers of delicate mauve and thin texture; *marginata*, also vigorous, with leaves of 2 to 3 feet long, and flowers of rich lilac netted with white veins from a paler edging; and *pavonia*, less distinct in colour but with very large flowers. Messrs. Delauil of Hyères claim to have raised a cross between the blue and white forms, in which the blue colour of the one parent remains unchanged, while the leaves are so short and the flowers so abundant as to make it the best of all for ribbon borders.

A plant so near this as to be often classed with it, is *Iris cretensis*, sometimes called *Iris unguicularis* var. *angustifolia*. Its leaves are shorter and very narrow, with smaller and more deeply coloured flowers of bright lilac purple, paler towards the throat. This is found in the Mediterranean region but further east than *I. unguicularis*, in Greece, Crete, and through the Grecian Archipelago into Asia Minor, rising in places to a height of 5,000 feet. The fact that it grows less and less like the Algerian Iris as one travels east, suggests that it is only a geographical form of it, needing the same care in cultivation, but flowering later, and not so good. B.

THE PERENNIAL TRUMPET FLOWERS (*Incarvillea*).

Until a few years ago, the Incarvilleas were known only as a group of some three or four members, of small interest save to botanists and little seen in gardens. But within recent years our knowledge of the Far East has increased, and from China and Japan have come a number of new plants, many of them hardy in our gardens, and telling of a wealth of beauty before undreamed. And amongst the plant-groups so enriched, few have gained more than these: there are now about a dozen kinds known, though several are not yet in cultivation. Most of them are found among the hills of Western China and Thibet, some species having a wider range than others. All are perennials, sometimes with a fleshy root and soft tissues, in others woody and sub-shrubby in character. Their flowers are large, handsome, and trumpet-shaped, like many of their nearest relatives; they are, in fact, perennial Begonias, with something of the fine colour of those handsome climbers. They thrive best in light warm soils, deep and rich to favour their strong roots, and well drained to preserve them from stagnant moisture in winter. In general they do better in the open border than under glass, where the tissues are softer and the flowers poor in colour. The following kinds are now recognised:—

Beresowski's Trumpet Flower (*Incarvillea Beresowski*).—This plant resembles the better known *I. Delavayi*, nor is it yet clear whether it should not be regarded as one of its forms. It has the same fleshy tap-root and pinnate foliage, with clusters of nine or ten purplish crimson flowers, but upon stems much shorter than in M. Delavay's kind. Thibet and Western China.

Bonvalot's Trumpet Flower (*I. Bonvaloti*).—This new plant from the same region is like a small form of *I. compacta*, with very dwarf growth, short leaves, and rather smaller flowers of similar colour.

Dwarf Trumpet Flower (*I. compacta*).—A hardy plant from North-west China, introduced in 1880, but still rare in gardens. It is a shy bloomer, bearing upon short stalks, hardly rising above the leaves, clusters of deep pink flowers, funnel-shaped, and about 2½ inches long. It is found in forms with stalks of various lengths, but is commonest of compact habit.

Delavay's Trumpet Flower (*I. Delavayi*).—This fine plant was found growing in the mountain pastures of Yunnan, at a height of from 6,000 to 10,000 feet, by a French missionary in Northern China, who sent seeds of it to Messrs. Vilmorin. A few years later it was also found growing with several other kinds in Western China and on the frontiers of Thibet, by Prince Henry of Orleans; its range is therefore wide. It was first flowered by Messrs. Vilmorin in 1892, and has since found its way into many gardens, where it has shown its value as a vigorous perennial, flowering in the second year from seed sown in April. The young plants sometimes bloom in the first autumn, but mostly not before the following June, when a few rosy or bright pink flowers with a tinge of yellow in the throat appear in a cluster at the end of a stout stalk, lasting in beauty for about three weeks. The dark green leaves vary in length, but often reach 2 feet long, and are finely cut, fleshy, and of a peculiar odour when handled. When these die away, a winter covering of dry leaves is enough in most gardens, and the plant will be stronger and bloom earlier than when potted for the winter. In cold districts the fleshy root may be lifted and stored like a Dahlia, but must be covered with soil and not allowed to dry. Well planted, the tubers gain force each season, forming at last masses of five or six flower-stems of about a yard high, with ten to fifteen trumpet-shaped flowers in a cluster, the lower ones drooping loosely from the central mass. Such old plants are fine objects during several weeks in early summer, and by planting a few in a place which is shaded (but not overhung), they will bloom later and lengthen the season of beauty. Early plants do well in light, free soil at the foot of a sunny wall, their crowns covered to a depth of 2 or 3 inches. They may also be grown in pots or in the greenhouse border, but are less fine. It has now been proved hardy in so many places all over the British Isles that there is small risk of its loss save in very cold and wet gardens, while it is so easily raised from seed that it can now be had cheaply and planted in bold masses. One peculiarity is that after flowering freely the roots will sometimes remain dormant for a whole year, but if left alone they seldom fail to start as strongly as ever after their lengthened rest. A variety sent out from the Musée of Paris is said to flower a little earlier in the season.

Vilmorin's Trumpet Flower (*I. grandiflora*).—This is the finest species yet introduced, with large flowers of rich and pleasing colour, as described by Mr. Gumbleton of Belgrove, Queenstown—perhaps the only gentleman who has yet flowered it in the open air. It is still a very scarce plant, but being a native of Northern China it is likely to be hardy in sandy soils, and is sure of a place in gardens when better known and more easily obtainable. It was found by Prince Henry of Orleans in 1890; but not until seven years later did plants flower in the garden of Maurice Vilmorin, and in the following year at Kew. Its flowers are larger than those of *I. Delavayi*, and the habit of the plant is dwarfer, with shorter leaves and rounded leaflets, while it blooms about a fortnight earlier. Its root, though large and fleshy, is less tuberous, throwing a scanty rosette of leaves rather more than a foot long, of deep shining green, and in young plants prostrate, arching when older. The flower-stem is at first short, but lengthens, with a succession of flowers, of which the last are generally the finest. On a strong mature plant they are nearly 4 inches across and 2 to 3 inches deep in the tube, the limb being divided into four broad lobes of soft rosy-carmine, deepening towards the yellow tube, and relieved by handsome white blotches in the throat. Instead of appearing in a cluster, they are borne upon separate stalks, each flower lasting ten or twelve days and mature plants blooming for three weeks or more, with spreading tufts of foliage and as many as a dozen flower-stems towards the end of May or early in June. It is easily raised and grown from seed in rich, free soil, but seedlings take three or four years to flower.

GOLDEN (PERENNIAL) TRUMPET FLOWER (*I. lutea*).—A fine plant not yet introduced, which in habit and general character approaches *I. Delavayi*, but is shorter in leaf and in length of stem. The flowers, about 2 inches long and wide, are carried in clusters of clear yellow. Western China.

PRINCESS' TRUMPET FLOWER (*I. Olgæ*).—A handsome perennial of shrubby habit, and hardy in all but cold districts. Its pretty cut leaves are borne upon long, straggling stems of 4 or 5 feet, which rather spoil its beauty. The tubular flowers, about an inch long and wide, are of a pretty pale pink, borne in loose clusters upon very short stalks during summer. Its colour is pleasing, and in a sunny border against a wall it is not without effect. Brought from Turkestan by way of Russia in 1880, and named after the Princess Olga. Syn. *I. Koopmannii.*

CRIMSON (PERENNIAL) TRUMPET FLOWER (*I. princeps*).—A new species, of which little is yet known save that it bears flowers of a bright red.

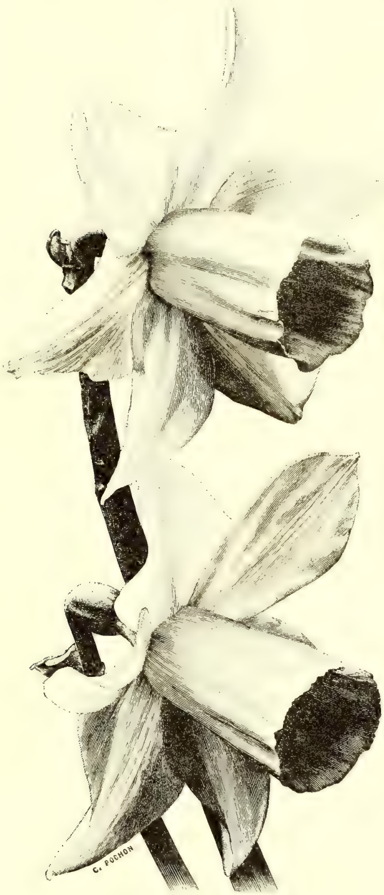
CHINESE TRUMPET FLOWER (*I. sinensis*).—This fine kind is of good habit, with large flowers of scarlet or bright crimson upon very short stalks. It is best grown as an annual or biennial from seed sown during summer. Being tender, it must be wintered under glass and planted in the spring, blooming during summer upon stems 2 to 3 feet high. There is a form with large flowers of reddish-purple.

FERN-LEAVED TRUMPET FLOWER (*I. variabilis*).—Also a native of China, introduced in 1887, but little known in gardens. It is a shrubby perennial of fine habit, but only hardy in light, warm soils and in mild districts. If sown early, seedlings not infrequently flower the same season. The flowers, borne upon stems of about 2 feet, are an inch long and of a beautiful light rose, with finely cut foliage of vivid green. It is beautiful for several weeks during late summer and early autumn, and though scarce is sometimes well seen in Devonshire gardens. B.

APPLE-TREES IN BLOOM.—It makes no difference that you have seen forty or fifty springs; each one is as new, every process as fresh, and the charm as fascinating as if you had never witnessed a single one. Nature repeats ever the same things; every year since our boyhood it has been following the same routine. There, for instance, is the Apple-tree, standing low to the ground, with a round and homely head, without an element of grandeur or poetry, except once a year. In the month of May, Apple-trees go a-courting. Love is evermore father of poetry. And the month of May finds the orchard no longer a plain, sober, business affair, but the gayest and most radiant frolicker of the year. We have seen human creatures whose ordinary life was dutiful and prosaic. But when some extraordinary excitement of grief, or, more likely, of deep love, had mastered them, they broke forth into a richness of feeling that mounted up into the kingdom of beauty, and for the transient hour they glowed with poetry. And so to us seems an Apple-tree when May seems to stir up a love heat in its veins. The old, round-topped, crooked-trunked, and ungainly-boughed fellow drops all world-ways, and takes to itself a new idea of life. Those little stubbed spurs that, all the year, had seemed like rheumatic fingers, or thumbs and fingers stiffened and stubbed by work, now are transformed. All its crookedness is hidden by the sheets of blossoms, and the whole top is changed to a royal dome. What if you have seen it before, ten thousand times over? An Apple-tree in full blossom is like a message, sent fresh from heaven to earth, of purity and beauty!—HENRY WARD BEECHER.

NARCISSUS, "EARL GREY."

THIS is a flower of difficult classification, being a cross between *N. triandrus* and *N. Emperor*. It is a stately flower, reminding one of a very large *Queen of Spain*. Perianth of pale ivory-yellow, with a long trumpet of clear citron yellow colour. A plant of striking habit and growth. Awarded a first-class certificate. F. W. CURREY.



NARCISSUS, "EARL GREY."

Lismore, Ireland.

MORE SPACE FOR BETTER VEGETABLES.—To the Editor of FLORA : Sir,—I think that not a few beside myself must have been interested by your recent article on "Quality in Vegetables." It is the rule in most English gardens to give far too much space to coarse things like Cabbages, Potatoes, etc., and far too little to the more delicate and nutritious kinds, some of which are, indeed, not represented at all, or so ill done as to be useless for the cook. The Potatoes, Greens, and other things that go with our ordinary dishes, are the very coarsest, least nutritious, and most indigestible of all, and there can be no fairly comprehensive idea of this branch of human alimentation which does not include the vegetables which are served abroad as dishes by themselves, and, indeed, are quite worthy to stand alone. Among others we have Scorzonera, Salsify, Lettuces, and Endives—with us there is great waste in not using Lettuces and Endive, and particularly the Batavian Endive, as braised vegetables ; for good cookery they are far more important than Greens. Celeriac, an excellent vegetable, is rarely well grown with us. Cardoons are first-rate vegetables for our country, for which soil and climate are well suited, and which ought to be regularly grown; Indian Corn, too, thrives in all the southern parts of the country, and, well grown, forms an excellent vegetable. Then there are Artichokes in the best varieties, edible-podded Runner Beans, edible-podded Dwarf Beans, early and small Carrots, such as the French *Early Horn*, Whitloof, Corn Salad, Potison jaune, and Kohl Rabi. The variety of delicious Gourds available during summer, and in keeping kinds through a great part of the winter, is a revelation to Britons who know nothing beyond the Vegetable Marrow. The Egg Plant, when delicately cooked, sliced, and fried in batter, is a good summer vegetable, and the edible-podded Peas of spring are equally good when served as a French cook knows so well how. In these matters our insular conservatism is at fault in failing to recognise the food value of these and other appetising vegetables; and even when they are tried, our habit of serving them with a hodge-podge of meats and other strong flavours, prevents appreciation of their own fine flavour.

RUSTICUS.

SCENTED-LEAVED PELARGONIUMS.*

Though scented-leaved Geraniums have disappeared from many gardens, they have never been without friends, and among such I think we may place George Eliot, whose appreciation of them is shown by a well-known passage in "Janet's Repentance." They have always been loved by cottagers, and years ago when we had to distribute plants in connection with a country flower show, we were constantly asked for an "Oak-leaved Geranium," a term covering all the scented kinds, though the variety specially desired was *Pelargonium capitatum*. I have been told that scented Geraniums and other fragrant-leaved plants are even more welcome than flowers to the sick in hospitals. Growers of these scented-leaved Pelargoniums have long bemoaned the confusion of their names. More than thirty years ago, Miss Hope in her delightful book "Gardens and Woodlands," says of them that great confusion prevailed among even the few names that she was able to give, a complaint that growers at the present day will certainly echo. I am, unfortunately, quite unable to give information on the subject; my object is to elicit it, and if possible to induce those interested in these plants to adopt means to establish some uniformity of naming.

There are standard works upon Geraniums, such as Sweet's and Andrews', but my experience when trying to name a collection of some fifty varieties from Sweet's *Geraniacæ*—in which 500 or more are described—has been hopelessly bewildering. Most of the beautiful varieties figured in his book seem to have been lost, or at all events, I have failed to find them, while the greater number of those we grow do not appear there at all. To take such a well-known variety as *Peppermint;* Miss Hope speaks of it as *lobatum*. In Sweet, *lobatum* is called the Cow-Parsnip-leaved Stork's Bill, and the plant so described has not even a distant resemblance to *Peppermint*. Plants have reached me as *pilosum*, *tomentosum*, and *Mrs. Seymour*, and in each case my old friend *Peppermint* appeared. *G. tomentosum* I believe to be its correct Latin name; Sweet says that it is often called *Peppermint*, though he calls it "Pennyroyal-scented." *Nutmeg*, too, is a variety that I have long wished to feel sure about; doing duty for it I have had both forms of *capitatum* sent to me, with several of the forms of *crispum*, and also *Turpentine*. Sweet figures *Turpentine* (*Pelargonium fragrans*), and calls it "Nutmeg-scented," though anything less like nutmeg it would be hard to imagine. The Ginger-scented Geranium we have vainly sought for; it is figured in Sweet as *P. zingiberinum* and appears to be one of the *crispums*, but in none of those known to me is there the slightest trace of ginger scent. Miss Hope mentions *capitatum* as "Rose-scented." The two forms of *capitatum* —or what I grow as such—are the commonest of all, but though strongly fragrant they are not rose-scented. Miss Hope may perhaps have meant the variety that we grow as *Attar of Rose;* the plants are entirely different, but so great

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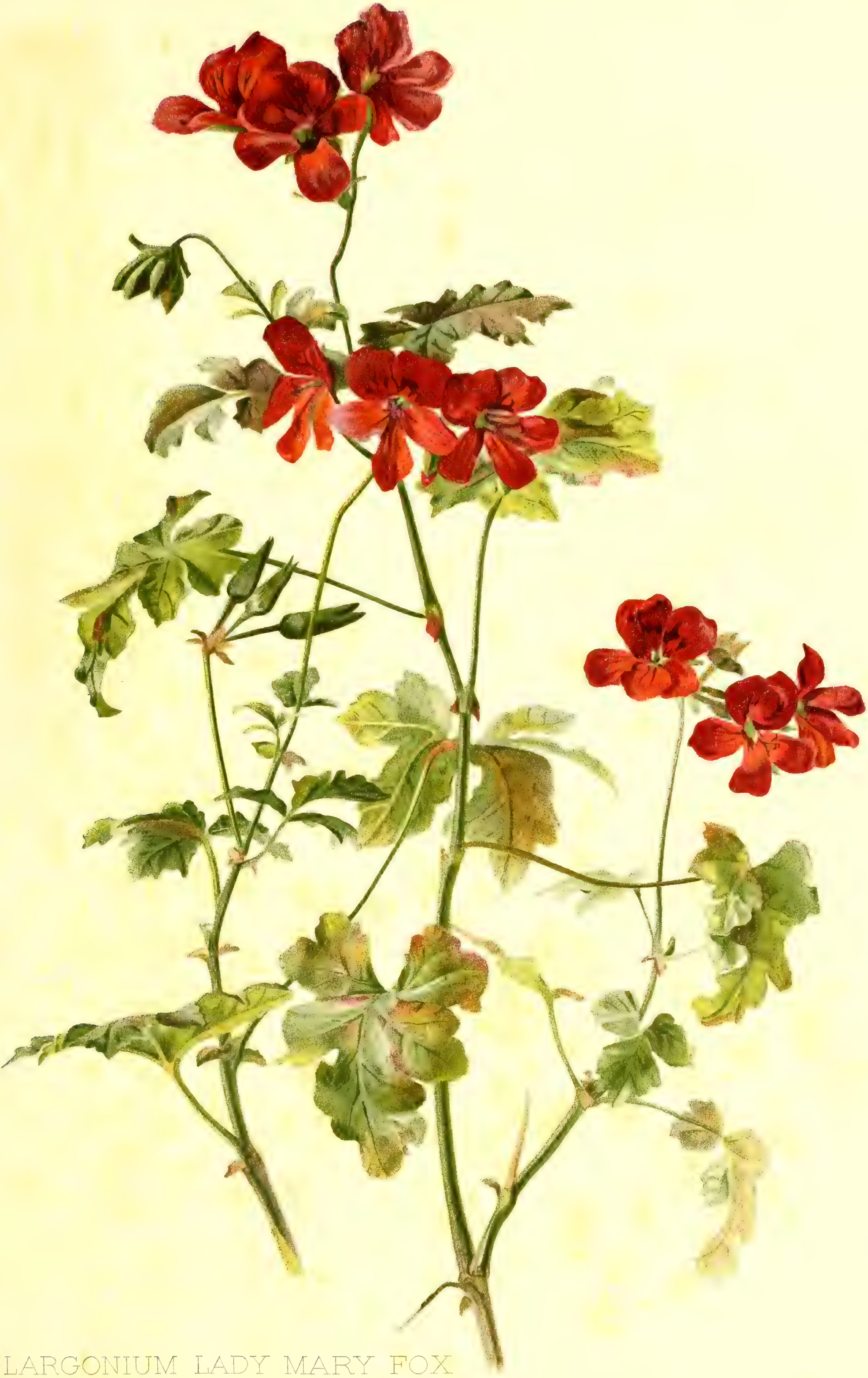
* With coloured plate of Pelargonium *Lady Mary Fox*, drawn at Alexandra College, Dublin, by Miss Mary Cameron.



PELARGONIUM LADY MARY FOX

is the confusion that anything is possible, and its scent might be called "rose." She also speaks of *quercifolium* or Oak-leaf: "*Fair Helen*, an Oak-leaf, the oldest"; her list of Oak-leaved kinds might have been extended for we grow at least six varieties belonging to that section. *Fair Rosamond* is one of them, but it is not the plant figured by Sweet, for leaves and flowers are different; the flowers in the plate are large and white, with carmine blotches on the upper petals, while the flowers of the variety that we grow are small and a dull pink. Then there is the *quercifolium minor* of the trade—and a good plant too—but *minor* is certainly a misnomer as it is much larger than *Fair Ellen*. *Radula* (or *Stag's Horn*) is also mentioned by Miss Hope, and is one of the few kinds which I have never seen under any other name; it is a handsome, free-growing plant, with finely-cut leaves very useful for cutting. A plant offered by the trade as *radula major* is decidedly confusing for it does not resemble *radula* in the least, its leaves being smaller and not finely cut. Miss Hope speaks of *Lady Scarborough* as being the minimum variety of *citriodorum*, but again this is not the plant as known to me or as figured by Sweet; his plate is perhaps meant for the plant that we grow, but if so it is unsatisfactory. The true minimum form of *citriodorum* has much smaller leaves, is deliciously sweet, and, to my mind, is perhaps the most charming of all. The *citriodorum* or *crispum* section is very bewildering for several kinds have the merest shades of difference, the smallest—that just mentioned—being one of the most distinct; the variety that we grow as the *Parsley-leaved* (probably wrongly so named) has also some marked characteristics; it is a much deeper green than the others, with leaves closely curled, and is more difficult to keep through the winter; several times we have nearly lost it. Many of the scented-leaved Pelargoniums do not show their true character as pot-plants, and it is often necessary to plant them out in order to prove their distinctness; plants looking almost alike when in small pots, often show marked differences when grown in a bed, side by side.

Geranium abrotanifolium (syn. *artemæsifolium*) is one of the most distinct, like a finely-cut Southernwood in leaf, very sweet, and so unlike a Geranium that even a good gardener to whom we gave it was quite incredulous until it flowered. Miss Hope mentions some varieties that we have failed to find—at least under her names,—*vitifolium* or the Balm-scented, *Laurenceanum*, *serrulatum*, and *Fair Emily*. Her "*Fair Helen*" I take to be our *Fair Ellen*. Then there is the Pheasant's Foot section (*glutinosum*, as they are sometimes called, though this name is quite as often applied to the Oak-leaved varieties). To this group belong *Duchess of Devonshire* as we grow it (there is a second variety with the same name); *filicifolium*, a very beautiful and finely-cut variety; and *Pheasant's Foot* itself,—often sent out as *denticulatus majus* and known under several other names. My *Blandfordianum* is true to the description given in Sweet; it is often called *Lady Betty Germaine*, and perhaps some reader may be able to tell me if this is its proper English name. *Geranium betulifolium* is very distinct, with small stiff leaves of dark green and rather large white flowers—altogether a pretty and useful plant. *Lady Mary Fox*—shown in the coloured plate—is one of the best and most useful for all purposes, excellent in the border, free and continuous in flower, and of good colour. It is a good pot plant, the edges of the leaves often prettily shaded with red, which harmonises with the flowers. It is a plant of many names, like most of the others, and has reached us at various times as *Mrs. Moon*, *Mr. J. Douglas*, *Old Irish*, and other synonyms. All forms of the *Unique* section are good, and *Scarlet Unique* the best. For several varieties we have no names that even purport to be correct, and in default of better we call them after the gardens from which they came. The following are the best plants under each head. For scent:—*Attar of Rose*, *abrotanifolium*, all the forms of *citriodorum*, *Lady Scarborough*, *Dale Park Beauty*, and *Prince of Orange*. The finest flowers are *Lady Mary Fox*, *Pretty Polly*, *Shrubland Rose*, and *Scarlet Unique*. Those most useful for cutting are *capitatum*, *radula*, *Sandback Beauty*, *quercifolium* (*minor?*), all the forms of *citriodorum*, *Pheasant's Foot*, *filicifolium*, and *Fair Ellen*. The most interesting and distinct kinds are perhaps *Blandfordianum*, *abrotanifolium*, *betulifolium*, *ternatum*, and the smallest form of *citriodorum*.

Culture. Most of the varieties are easily grown in light, rich soil, the chief care being as to green-fly. They root easily as cuttings, and many of the varieties can also be increased from pieces of the root, but cuttings are more satisfactory. They are finest when grown as large trained specimens, but space cannot always be spared for this way of growing them, and very good results can be had more simply. In conclusion, let me again disclaim all idea of vouching for the names given; for the most part I have adopted those most commonly used, but I am aware that this is far from being a proof of their correctness. If anyone can help me in revising the names of the kinds in cultivation I shall be grateful, for, as I said at the outset, my aim in writing is that by some means we may determine "Which pretender is, and which is King."

H. M. WHITE.

Alexandra College,
Dublin.

THE PIGMY TREES OF BRITISH COLUMBIA.—A note in the *Botanical Gazette* describes a forest of dwarf trees recently found upon the west coast of Vancouver Island, British Columbia, and in the main so nearly like the Pigmy Trees of Japan as to raise the question whether these may not have originated in the attempt to produce by artifice what had been observed in nature. The little trees in question are of three kinds; the White Cedar (*Thuja gigantea*), the Western Hemlock (*Tsuga heterophylla*), and *Picea sitchensis*. Though ranging from less than a foot up to 2 feet or a little more in height, the little trees examined were found to be of great age, one tree under 12 inches high and with a stem less than three-quarters of an inch in diameter being eighty-six years old, and a second, very little larger, showing 98 annual layers. They grow close to the sea upon the edges of tilted layers of slate, in such scanty soil that in many cases the roots lift out in a flattened mass like a sheet of coarse brown paper, and exposed to the constant fret of salt breezes.

THE TREASURE FLOWERS (*Gazania*).

THE introduction of new kinds always arouses a certain interest in the group to which they belong, and more especially is this the case with a gain in colour. As a result, growers turn to older kinds also, in order to test the value of the newcomer by crossing and comparison, and, while hybrids of real value often result, the publicity thus drawn serves to dispel previous neglect. Such has been the recent history of the "Treasure Flowers" or Gazania group—a brilliant South African family, delighting in bright sunshine which alone reveals the splendour of their flowers, those of many kinds remaining closed during damp or cold weather. For this reason their full effect is only seen, with us, when a hot season that exhausts other plants serves to develop the fine colour of these sun-lovers. One of the impressive features of the Treasure Flowers is the ring of bold markings in one or two colours, seen at the base of the petals ("*ligules*"); this ring is not found in the few self-coloured kinds such as *Gazania pygmæa* (*nivea*), and *G. pygmæa lutea*, but is present in almost all the rest. Crossing has already given notable results among the Gazanias: thus *G. pygmæa* and *G. longiscapa* have produced a series of showy colour varieties; *pygmæa* and *splendens* have given a second distinct race of hybrids; while growers in France and Italy have of late years raised many seedling forms, of which the best are well worthy of cultivation.

The Gazanias of to-day vary in colour from white to deep orange, with intermediate shades of cream, yellow, and gold, with or without the darker blotchings, which are again endlessly varied. The under side of the petals is also shaded with violet, rose, or blue, this shading differing somewhat with each kind and being deepest in the hybrids. Nor are the plants less varied in leaf, some bearing grassy foliage, other kinds leaves that are oval or cut, and often shining or glossy above while white and downy upon the under side. Their habit is that of low, stemless herbs, sometimes trailing, or more seldom with an erect stem rarely more than 9 inches high. According to season they bloom from early in May until the dark days of autumn, their flowers opening from 8 or 9 A.M. till near sundown; but different kinds vary in the ease and rapidity of their expansion, those with broad petals such as *Gs. splendens*, *rigens*, and *E. Benary*, being the best in this way and opening on fairly warm days even without sun. Most kinds, however, are obstinate, yielding only to sunlight.

Culture. Being tender, the Gazanias can only be used in the open during summer, and many growers (such as Mr. Gumbleton) prefer to keep their plants in pots, where they flower with greater freedom. None the less, in sunny gardens of warm soil Gazanias may be used with fine effect, such kinds as *Gs. splendens* and *rigens* spreading as a neat carpet of great beauty. Kinds of taller growth form tufts, such as *Gs. E. Benary*, *nivea*, *latiflora*, *pygmæa lutea*, *aurantiaca*, and some of Sprenger's seedlings; these may be grown in rear of the dwarfer sorts or grouped together in the border or rock-garden in such dry and sunny spots as are unsuited to many other plants. They do best in hot sandy soil that is not too rich, for though growing freely in heavier ground the flowers are few; in such gardens they do better in pots. When in growth Gazanias should be freely watered, if they are to do well in the sandy soils best suited to them. As greenhouse plants they should be potted firmly into small pots, which may be sunk to the rim if the plants become pot-bound. Air should be given whenever possible, in fact most kinds may be flowered quite well in cool frames and fully exposed save in cold or wet weather. During winter they should receive little water and all the sunshine possible, and though they will bear a few degrees of frost, this trial should be spared them. The finest flowers come upon young plants, renewed each season.

Increase. Many of the Gazanias yield fertile seed, and seedlings are of vigorous growth, but good kinds are so few and the progeny so differs from the parent that for the garden they are best grown from cuttings. These should be taken in August or September and struck in cool frames, the method differing a little with different kinds. The tufts of the stemless plants need dividing with care, each crown being cut with a heel and placed in its own small pot; in the stem-forming kinds the work is easier and seldom fails. Cuttings may also be rooted in heat during spring, but the result is seldom so good. A few kinds including *Gs. nivea*, *latiflora*, *longiscapa*, *Pavonia*, and Dammann's hybrids, may be increased by division, but for general purposes cuttings are best.

Kinds. This monograph by M. Jules Rudolph, published in the Journal of the French "Société Nationale d'Horticulture," is the most up-to-date record of the Gazania group, one which was in utter confusion, owing to imperfect knowledge, the absence of a complete collection of living plants, and the variety of form assumed by the same plant which is often again modified by cultivation. With the object of compiling a complete account of the group, all the available species and hybrids were gathered, selected, and doubtful and inferior kinds rejected; these notes are the fruit of much study, their aim being to arouse wider interest in these interesting and showy perennials.

The following species and hybrids are the best of those in cultivation:—

G. armerioides.—A distinct plant of low compact growth, with grassy leaves the edges of which are rolled inwards sometimes to the midrib, and partly clothed with soft hairs. The flowers of 1½ to 2 inches are pure white, shaded with purple on the outside of the petals. Natal and eastern Cape Colony, at from 1,000 to 2,500 feet.

G. Burchelli.—An annual kind and one of the most distinct, varying much in height and habit of growth. Narrow leaves rolled at the edges, covered with down, and with white hairs upon the margin but not white on the under surface. Yellow flowers from 1 to 1½ inches wide, with a ring of purple spots around the centre. Bechuanaland and Orange State.

G. cæspitosa.—A small-flowered species and one of the most remarkable, with prostrate woody stems growing as a compact tuft and thickly covered with rigid spiny leaves of an inch long and spotless yellow flowers of 1 to 1½ inches. Snow Mountains in the district of Graaf Reinet, Cape Colony.

G. jurineifolia.—Very dwarf and distinct, with divided leaves an inch long, green and smooth above and grey beneath, with spotless white flowers little more than an inch across and striped with purple on the under side. From around Colesberg in Cape Colony, into the Orange State.

G. *Lichtensteinii.*—An annual species, with prostrate stems sparingly branched and bearing narrow oval leaves, flat or very little rolled, and clothed when young with a soft down, soon disappearing from the upper surface. Yellow flowers of 1½ inches, with a ring of dark brown spots, and purple shading upon the outer petals. Namaqualand.

G. *longiscapa.*—An old kind and one of the best, growing as an erect grass-like herb into dense tufts of dark green leaves, white on the reverse. Bright golden flowers, borne well above the foliage and among the earliest kinds to open; the flowering may be retarded by pinching the earliest buds. South Africa. Syn. *Gazaniopsis stenophylla.*

G. *montana.*—A dwarf plant growing as a tuft of many stemless crowns, with erect grassy leaves of bright green with silver reverse, and sparingly covered with down. The flowers appear upon tall reddish stems of 9 or 10 inches and are white with a ring of deep yellow surrounding the golden disk, and the outer side of the flower shaded with rosy-violet. A beautiful and free-flowering plant, best grown in pots. There is a variety *alba*, in which the flowers are pure white.

G. *Pavonia.*—A robust plant with erect sub-shrubby stems of as much as 18 inches; downy leaves, simple or divided, and rolled at the edges. Large flowers of rich orange yellow with dark blotches at the base of the petals, which are again just touched with white in the centre. An old plant cultivated for more than a century, fine in colour in a good season. Cape of Good Hope. A variety *aurea* is of more trailing habit, with greyish green foliage and prostrate stems finely spotted with red. The flowers are golden yellow, marked in the same way with black and white at the base of the petals, and are very handsome. Grows better in pots than in the open, both forms being well worthy of cultivation. Syn. *Gorteria Pavonia.*

G. *pinnata.*—A species emitting many stems from a woody base, with leaves divided into narrow lobes and covered with short stiff hairs above. Erect flowers of 3 or more inches from June to August, yellow, with a ring of black spots around the disk. Syn. *Mussinia pinnata.*

G. *pygmæa.*—A species forming a stemless tuft of grassy leaves, silvery-white beneath and with a distinct pale rib above; white flowers of delicate texture, shaded with rosy-violet on the under side. Natal. Syn. G. *bracteata.* This is a very variable kind grown in several forms superior to the type, amongst which are *latiflora* (Lemoine) a fine free-flowering variety with broad-petalled flowers of great beauty, creamy-white striped with violet beneath. A good variety known as *lutea*, sent out by Dammann of Naples in 1901, is a profuse bloomer of good habit with a long season of beauty and very large flowers of chrome yellow with a lighter zone around the disk. A third form, *aurantiaca*, is yet more vigorous, growing 9 or 10 inches with pale orange flowers, darker towards the base of the petals, with a ring of paler specks around the centre. Other seedling forms exist which differ widely in leaf and flower, the reverse of one kind being finely shaded with blue.

G. *rigens.*—The oldest and most beautiful of Gazanias, in cultivation before 1755; its native country is now unknown, though believed to be the district of Saldanah Bay or around Talbagh in East Africa. It is of free growth, reaching more than a foot in height, with a shrub-like base and smooth narrow leaves which are white and downy beneath; flowers of rich orange, with a ring of black and white spots. By some authors this plant is held to be identical with G. *splendens*, but, having grown and compared the two, we prefer to regard *splendens* as a form of *rigens* and it is here classed as such. As the best known of all it is needless to describe G. *splendens* in detail. It is much used in sunny borders where its flowers of rich orange with a ring of double white spots edged with black and purple are of fine effect; a variety grown for carpet-bedding has the leaves variegated with yellow. There are in existence dried flowers (as also a coloured drawing) of a further handsome form of G. *rigens* known as *purpurea*, with flowers of rich reddish purple marked with a dark blotch at the base of the petals, and a disk of purplish-black; though at one time in cultivation, living plants are now unknown.

G. subulata.—A handsome species with leaves of two shapes, some being long and narrow and others cut into two or three lobes upon either side; yellow flowers of 1½ to 3 inches upon hairy stems, with a blotch of purplish-black at the base of the petals, and shaded with purple beneath. July and August. Cape. 1792. Syn. *Arctotis staticæfolia*, and *Mussinia linearis*.

G. tenuifolia.—A pretty annual kind of trailing habit, with leaves cut into lobes and rolled at the edges, and a profusion of small yellow flowers with a ring of dark spots towards the centre. Namaqualand.

G. uniflora.—Not a showy plant but very distinct, with a loose habit of growth and trailing stems bearing leaves often entire but sometimes cut, and yellow flowers during July and August, 1½ to 2 inches wide, and shaded with brownish-purple beneath. Cape. 1816. Syns. *Gorteria* or *Mussinia uniflora*.

Named Hybrids.

These are now so many that only the best and most distinct plants of each series can be noticed; such choice kinds are:—*Bianca* (Dammann), sulphur-yellow passing to white, with a ring of violet spots and a blue line on the reverse of the petals; *Blondine* (Dammann), a fine kind with large pale yellow flowers passing to deep orange at the base of the petals, relieved by a zone of white specks; *Couronné* (Lemoine), a broad-petalled white flower with a wide ring of dark spots surrounding a golden centre, and purple beneath; *Diadème* (Lemoine), akin to *G. pygmæa* but more robust, with erect leaves of 6 inches and large flowers of creamy white, yellow at the base with a dark blotch pointed with white, profuse and distinct; *Diana* (Dammann), flowers creamy-white shading to an inner zone of chrome-yellow; *Elmensis* (Sprenger), a compact and beautiful plant bearing large flowers of orange-red with black and white spots towards the centre; *Emile Lemoine* (Pfitzer), large white flowers with black spots towards the centre and shaded steely-blue beneath, with the petals recurving; *Ernst Benary* (Pfitzer), one of the most beautiful kinds, forming a low tuft of erect leaves which are pure white on the lower side, and bearing a profusion of large white flowers with a deep black ring around the golden disk; *Gloriosa* (Sprenger), a low tuft with long stems bearing smallish white flowers shading to yellow at the centre, with a zone of black and white spots; *Nora* (Dammann), flowers of creamy-white shading to sulphur yellow, with a similar ring of spots; *Ochroleuca* (Sprenger), a stemless plant with grassy leaves, and golden flowers spotted with brown and cream-colour towards the centre, reverse rosy-violet. Lemoine's hybrids are raised from *G. splendens* and *pygmæa*, the strain sent out by M. Thiebaut as *G. Cyclope* having the same parentage and being nearly identical. Dammann's race originated from *G. pygmæa* and *longiscapa*, and Pfitzer's from *pygmæa* and *rigens*.

A subsequent note by M. Rudolph in *Le Jardin* gives a few further kinds chosen for their excellence after two years of study, and from among upwards of 400 selected hybrids. These are all as follows:—*Bicolore*, a neatly tufted plant with oval leaves, and spreading somewhat at the root. Charming flowers of pale sulphur-yellow on first opening, becoming pure white, with a yellow eye bordered with yellow and ringed about with black spots. *Diapré*, a plant of great vigour, with narrow leaves and erect stems. Flowers large and full, of rich yellow even to the disk, which is ringed around by black spots touched with white in the middle. *Etiolé*, a very beautiful and free-flowering kind, with grass-like leaves and large starry white flowers deepening to a pale sulphur shade towards the centre, which is ringed round with a band of dark spots. *Fleur d'or*, a robust plant bearing large flowers high above the foliage, their colour golden-yellow with a band of reddish-brown spots about the disk. *Papillon*, a plant spreading into low broad tufts of oval-lanceolate leaves, with large white flowers charmingly flaked about the centre by black spots, which are again pointed with white in the middle. This is a very pretty kind and most useful in the border, where it might well pass as a white form of *Gazania splendens*. *Rayon de soleil*, a stout erect grower, with narrow leaves and dainty flowers of deep pure yellow, very distinct in their glowing colour.

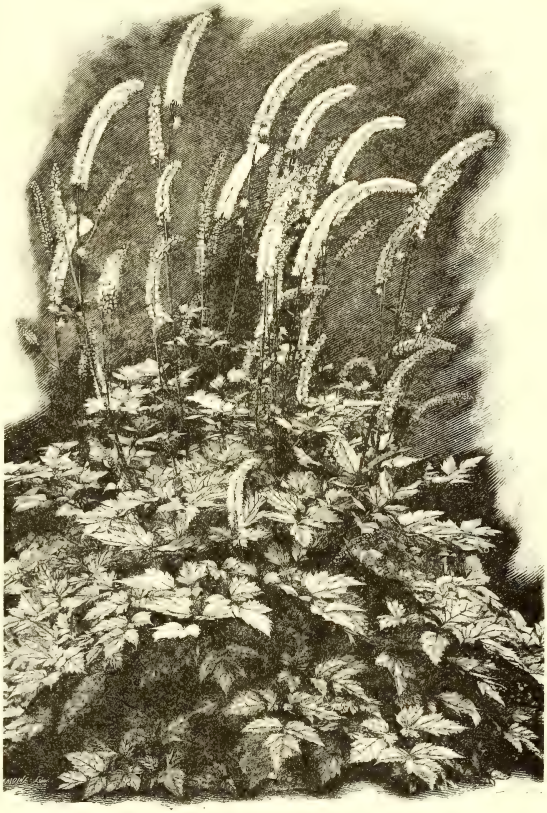
A JAPANESE BANEBERRY

(*Actæa japonica*).

THIS fine kind from Japan is at once the finest of the Baneberries and one of the stateliest, most graceful and showy of hardy, flowering plants. Attractive during summer in its clean, dark-green, Elder-like foliage, it becomes strikingly beautiful during its flowering season in later September and throughout October, until stricken by black frosts. Its long erect racemes of white flowers go well with the tall blue panicles of the Monkshood in the autumn garden, when the floral pageant has begun to wane; and ranged with them in vivid blue and white array, one may scarcely miss the symphony of the big blue Larkspurs and Madonna Lilies of July. The plant, which is well illustrated by a portion of one growing in the grounds of George Ellwanger, is as yet little known: the tallest spikes in this plant are over 4½ feet high, and it is hardy and easily grown. The flower-buds remind one of a Pyrola or some of the Deutzisa, while the expanded blossoms, save for their purer white, are not unlike a more tapering spike of *Clethra alnifolia*. There are few more gracefully conspicuous flowers than this noble Actæa, when, succeeding the white and pink Japanese Wind-flowers, its slender chastely silver spires rise in stately profusion to enrich the glories of the garden in the fall.

GEORGE H. ELLWANGER.

Rochester, New York.



THE JAPANESE ACTÆA (*Engraved for "Flora"*).

THE ORIGIN OF THE ESPALIER.

IN a recent bulletin of the National Horticultural Society of France, M. Georges Gibault has an interesting article upon the early use of the espalier in gardens. He says:—

The term espalier probably comes from the Italian *spalliera*, whence the French *épaule*, or "shoulder," used in the sense of a support. Some authorities trace it to the old French word *pau*, *espau* meaning a stake or pole, since at the outset the espalier was simply a hedge of fruit or other trees, supported by stakes. Whichever of these sources is accepted, it is certain that the word formed part of the French language of the XVIth century, in its transitional form *espaulière*. The espalier was at that time a palisade of evergreens, so clipped and shaved as to form a wall, and planted either for ornament or shelter. Not that the planting of fruit trees upon walls was unknown at that period, for in cold and even temperate countries it must have struck the planters of those days that trees so sheltered gained in many ways, not only by the support and shelter, but as presenting the largest possible surface to air and sunlight. Thus the practice of planting in espalier originated in the middle ages, and was certainly followed in the best gardens of the north of France, and perhaps also in Belgium, Holland, and Germany, more especially for the cultivation of the Vine, as needing all the sunlight possible. Old books do not mention this, but there is other evidence of the fact in an old painting of the Louvre collection, called *Une donatrice*—the portrait of a lady of the XVth century, belonging to the Franco-Flemish school of art. This painting shows an espalier for vines, very neatly put together, and in which they are supported in a curious way by four strips of linen or white cloth stretched lengthwise, regularly spaced, and fixed with nails to wooden uprights painted green. A photograph could not be more precise in its details, and here we have evidence of the use of the espalier in gardens as early as the XVth century, and that in a way which suggests a long previous practice. This is interesting in view of the common idea that espalier cultivation only dates back to the reigns of Louis the XIIIth or XIVth, though doubtless that period saw a great extension of the system.

Claude Mollet, gardener to Henry III. and Henry IV. of France, first speaks of espaliers, properly so-called. Writing early in the XVIIth century he plainly regards them as nothing new, but recommends them only for the Apricot and the "*Paire*," which he says "Are to be trained against a trellis along a wall, exactly facing the sun in the south." Jacques Boyceau, Sieur de la Barauderie, Intendant of the gardens of Louis XIII., in his "Traité du Jardinage" (now very rare) of 1638, devotes a chapter to espaliers and the practice of spreading the branches "in the form of an open hand," a system that was plainly well known at the time. The espalier cultivation of Peaches, Apricots, Figs, Almonds, Plums, and several kinds of Pear, are part of his system, the trees being protected while in blossom by awnings. About the middle of the XVIIth century the espalier —in the language of the time—*fait le principal ornement des jardins*. Magistrates like Guillaume de Lamoignon and Lefevre d'Ormesson, courtiers like Arnauld d'Andilly, and many church dignitaries, developed a passion for fruit culture. About this time also appeared some noteworthy books on the subject, which may still be considered as classics. The earliest of these is the "Jardinier Français" of Nicholas de Bonnefons, which appeared in 1651. The earlier editions contain a pretty engraving on copper by the artist Chauveau, showing an espalier in course of preparation, with its wooden trellis fixed to the wall. This vignette is wanting in later editions, but the original is to be seen at the French Bibliothèque Nationale. Following this was "La Manière de cultiver les Arbres Fruitiers," by Le Gendre, curé of Hénonville, the first edition of which saw the light in 1652. The next year appeared "Instruction pour les jardins fruitiers," by Triquel, prior of St Marc; while yet another ecclesiastic treats of the subject in the "Jardinier royal" of 1661. This volume, at first wrongly attributed to Robert Arnauld d'Andilly—the jansenist of Port Royal—is now known to have been the work of Guillaume Cardinal, a Canon of Beauvais. Of these old writings it has been said by Petit-Thouars, in "Le Verger Français," that "What the art has really gained since they were penned, may be reduced to a small number of essential points." Admitting that this can hardly be maintained at the present time, it is certain that the publication of these volumes marked an epoch in the history of fruit culture in the wide establishment of the espalier, and the beginnings of that careful pruning which has been the direct consequence of the system, and the foundation of our present methods.

FLORA

AND SYLVA.

Vol. III. No. 27.] JUNE, 1905 [Monthly.

MR. MERVYN MACARTNEY ON GARDEN DESIGN.

A PAPER was recently read by Mr. Mervyn Macartney before the Royal Institute of British Architects, entitled "Garden Architecture," and its reading is a welcome change from the dreary repetitions on this subject. It is new to find a writer frankly admitting the ugly and inartistic results of much of the work done in the name of architectural gardening. It is all the more welcome because most writers on this subject do not take the trouble to study the practical outcome of their views.

"*There are some of the largest and most elaborate creations that fail to excite pleasure in my mind, such as Trentham, Longford, Castle Ashby, Drumlanrig, and even Versailles and Pamphile Doria. It is difficult to say straightway why it is so, and I feel it is rather presumptuous on my part to state such a proposition; but I am sure that Sir Charles Barry must have been disappointed at the result of his labours at Trentham. In the case of Versailles there is a sense of enormous effort with little result. Vast terraces, lagoons of water, and huge fountains produce no satisfactory effect, only a sense of futility—a useless expenditure of labour and money without adequate return—and therein lies the keynote to the whole matter. Compare Versailles or Trentham with Villa d'Este, Montacute, or Melbourne, and one feels that failure is writ large over both the former conceptions.*"

Here is the truth—enormous waste to procure effects sometimes so bad that *hideous* is not too strong a term to describe them. And if they strike an architect as bad, what of the planter whose labours are paralysed by this waste, by these useless impedimenta, by beds that are impossible to plant with any hope of good effect or even of good growth of the things planted? Mr. Macartney sees the difference between gardens like Haddon and Bramshill, and the stereotyped formal gardens of our own day, but does not state the cause for this difference.

The reason why these older English gardens satisfy the critic is that they were made to suit the nature of the ground, whereas the spectacular gardens he deplores are "built drawings." They were in many cases made before the stereotyped plans were as accessible to "the young man in the office" as they now are. They grew out of the ground itself, as all well-designed gardens must. No garden is good or even tolerable which does not form a picture, or rather a series of pictures in the course of the year.

"*So it is with Wilton and Melbourne, and herein lies a difference from the Italian examples. They generally owe a great deal to position: perched on*

> *a hill you have vistas of distant country framed by towering cypresses into delightful pictures. Yet in the British examples you have a distinct sentiment; it is of a garden that you love—a charm that can only be gained by the employment of rare knowledge and design. There is a subtle charm about the terrace at Haddon Hall and the bowling green at Bramshill that is entirely absent in Trentham or Versailles. There is no great striving after effect. I would rather be the designer of Montacute than Versailles—I will go farther, and say of the Haddon Hall terrace rather than Versailles. Indeed, there are few of the vast garden conceptions that please me. Chatsworth bores me, so does the Crystal Palace; yet they are laid out on grand lines: they are meant for spectacular performances, and unless all the fountains are playing the effect is dismal as an empty theatre. We do not feel this at the Villa d'Este or Borghese gardens. I cannot recall a single picture in which either the Crystal Palace or Versailles is brought in.*"

Just think of a garden being laid out for "spectacular performances"—the last place in God's earth where the idea should even come into the mind.

> "*The Albani was laid out by Marchionne largely to show off the rich collection of antiques collected by Cardinal Albani. The plan is a good example of carpet gardening. I cannot say that it appeals to me. I have but the faintest liking for the geometrical garden. Its mathematical pattern excites no pleasurable emotions; still parts of it are excellent—like the curate's egg.*"

Does it appeal to anyone with the slightest glimmer of feeling for the beautiful? But is it not the stereotyped Italian or geometrical design that leads to the geometrical planting that Mr. Macartney deplores? People are afraid to be free or natural before these elaborations spread out before their windows. Even nature-lovers who see the ugliness of it all are led to tolerate it, and so we get gardens that are certainly not English and only bastard Italian.

The distinct advantages of our islands in leading us to a more charming type of garden than the Italians ever possessed, are rightly referred to by the author.

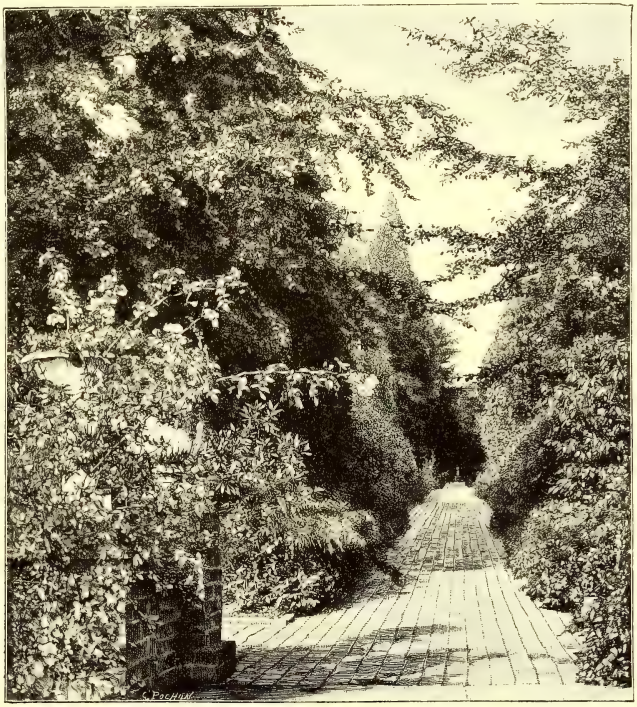
> "*You cannot dissever yourself from your climate; and though I vastly admire the superb cypress, ilex, and arbutus groves of Italy, I am as fond of our deciduous trees, even in winter. It may be impious, but I do not care very much for the appearance of evergreens in England except the yew and holly. Their foliage has a hard metallic look that seems to indicate that they are not happy in their surroundings. Nature is supposed to hate straight lines, and therefore winding paths, sloping lawns, and wavy beds are introduced to satisfy votaries of this style.*"

An error is embodied in the above which is so harmful that it is well to point it out. "Winding" paths made for the sake of their winding about "wavy beds" are not any essential part of what is here called the "natural style." We suppose that if Mr. Macartney had a lawn sloping down to a gentle river-bank he would accept it as such and not call it an invention of the naturalistic school? and that if he were forming walks in hilly ground he would be glad to make his paths bend around the lines of easiest grade—often beautiful ones? He may rest assured however that in many cases winding paths are no essential part of good work; that we accept straight paths no less than winding paths; and that we can plant beside such paths as beautifully as by any others.

In many valleys there are lawns made by the earth-mother better than man can make them, and the question is do we improve these by disfiguring them with paltry imitations of the Italian garden, so out of place and yet so common in Britain. W. R.

GRACEFUL BACKGROUNDS.

It is too readily assumed that the only proper background to a border is a clipped hedge, stiff and hard in outline, and often with still more objectionable features. That was the old notion and the only one, of designers of gardens, and for that reason we see there were gardens in which every tree was clipped, not only near the house but in the landscape also. It is a common feature of Dutch, French, and Austrian gardens, designed evidently by people who did not know one tree from another, but looked upon them all as bits of colour, much as they might stone or brick. One thing which the introduction of many plants to our country has done, is to give us material for rich and beautiful backgrounds, either in trees or shrubs, for stature, verdure, charm, and grace, if we will only use them and allow them to keep their natural shapes, which even tree-butchers might be induced to spare. Even if we have only straight walks to adorn, that is no reason for clipping our materials to the same stiff outlines, as we may see in the example here illustrated. We can select our trees and shrubs to the desired height and so as not to rise above our wants in any given place, that is if we know them well enough; and there are a great many to know. We get shelter, shade, and verdure, not from hard ugly lines but from things beautiful in themselves.



A Straight Walk with Free Vegetation (Hammerfield, Renshurst).
Engraved for "Flora" from a photograph by F. Mason-Good.

This is the great difference between the modern and the ancient garden. In our artistically treated pleasure gardens of to-day we have freedom of line and graceful form, in addition to any beauty of flower the trees and plants may possess; while the variety we have to help us is so great that we need never yield to monotony of colour or arrangement.

SEEDLINGS OF CROCUS CHRYSANTHUS.

Now that so many species of Crocus are grown in our gardens, it is much to be wished that more people who grow them would raise seedlings. The variety and vigour shown by seedlings are most remarkable and would well repay the small trouble of gathering and sowing the seed, and the necessary wait of three years for flowering. *Crocus chrysanthus* alone has produced during the last few years some of the most beautiful forms I know. One of these seedling forms was shown at the first February meeting of the Royal Horticultural Society, and was illustrated in *The Garden* for March 18. It is at first sight hard to believe that a white Crocus, richly suffused with purple on the outside of the outer segments, can have anything to do with *chrysanthus*. Its parentage however is well known. It was raised in Mr. van Tubergen's nurseries at Haarlem from seed of *C. chrysanthus pallidus* (see Flora of April 1904, fig. 4), and I hear that this season seedlings from the purple and white form have given the typical var. *pallidus*. One of the features of these forms is the increase in size and vigour they show over the wild forms. The question arises what should we call this purple and white form? I hope to show that it is a form of *chrysanthus* var. *cœrulescens* of Maw, a plant that has been much misunderstood in gardens.

Maw's diagnosis of it in his monograph is "segmenta alba extus purpureo et cœrulescenti lilacino ornata," and on Plate LXII. fig. 1, *e.* and *f.* represent this variety, both show the outer surface of an outer segment; one white, broadly suffused up the centre with purple, and feathering slightly—the other, with the exception of the yellow of the throat, entirely suffused with lilac. So I think we may conclude that Maw intended this varietal name to apply to a form white internally and with the three outer segments externally more or less suffused with purple shades. In its less suffused forms it is not uncommon in collections as *C. chrysanthus albidus*—which however Maw describes as "segmenta extus alba, basi flavida," and figures as *d.* on the same plate. I have seen his specimen in the herbarium at the British Museum, and there is no trace of lilac on it. Clearly then, all forms with lilac markings, however slight, should belong to var. *cœrulescens*.

In 1901 I showed before the Scientific Committee of the Royal Horticultural Society some seedlings flowering for the first time. Two of these, except for size, may be considered identical with the Haarlem seedlings, and one of them has, now that it is strong, equalled them in this respect. Since then I have raised many more, which, though showing a great degree of variation, are all closely related. These I believe to come from two sources, the plant above mentioned as grown in gardens as var. *albidus*, and a small feathered form, not at all common, and grown as *C. biflorus* var. *nubigenus*, but in that the outer segments are externally yellower than in other forms of *biflorus*, and the anthers have the distinctly black-spotted barbs so characteristic of the *chrysanthus* forms, and also some of the seedlings are a good yellow externally,—I think we should consider it a feathered form of *chrysanthus* var. *cærulescens*. In the British Museum herbarium is a sheet of this plant collected by Maw in 1877 on Mount Chamlijah, above Scutari, Constantinople, (No. 289). All show the black-spotted anthers, and though they vary considerably are clearly but one form. They are poorly represented on Plate LIX. *b*. of Maw's monograph fig. 3 *h*. and referred to on pp. 291 and 293 as *biflorus* var. *nubigenus*.

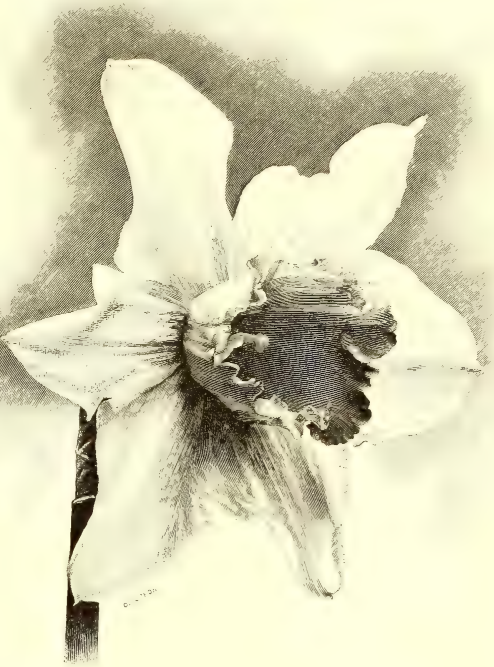
I have growing here every intermediate form from almost pure white with but slight lilac markings, through striped and feathered forms up to the richly suffused Haarlem seedlings, and with very rare exceptions they have the black spots on the anthers, so that unless we consider the Chamlijah plant as intermediate between and connecting *biflorus* and *chrysanthus*—a step our present knowledge does not warrant (for so far none of the seedlings are nearer to typical forms of *biflorus* than the Chamlijah parents)—we must regard it as a *chrysanthus* var. *cærulescens* in which the purple marking has broken up into featherings; while the Haarlem seedlings, and mine of 1901, represent the extreme of purple suffusion as yet reached.

E. AUGUSTUS BOWLES.

Myddelton House, Waltham Cross.

NARCISSUS, "REV. CHARLES WOLLEY DOD."

THE classification of this hybrid (*Ajax* × *triandrus*) is somewhat difficult. If the parent plants are considered, this flower ought not to rank with the *Incomparabilis* section, although in form it belongs to that class. It is a fine bold flower, with perianth of good substance and form. The somewhat goblet-shaped trumpet is elegantly frilled. This fine bicolor will take a high place among the standard Daffodils of the future.



F. W. CURREY.

Lismore, Ireland.

THE GENUS CYMBIDIUM, WITH A COLOURED PLATE OF C. PARISHII SANDERÆ.*

The chief reason why many of the strong-growing and handsome Orchids from high altitudes are not more generally grown in gardens, is that an Orchid-house is thought to be necessary for them. But a very good selection of Orchids can be made (including the showiest of the Cymbidiums), which would thrive in any warm greenhouse or conservatory with no more care than is given to many less worthy plants and at no greater cost than for ordinary greenhouse stock. A warmed conservatory is the adjunct to many modern dwellings and in such structures *Cymbidium giganteum*, *C. Lowianum*, *C. Tracyanum*, and other large-growing species and hybrids, thrive well, and their foliage, fresh and bright at all seasons, renders them excellent ornaments, especially if the larger plants are raised on pedestals or the prominent points of rockeries—where such are available. To crown other good qualities their long sprays of showy flowers open frequently in winter and spring, and last in good condition for a long time. Incidentally it should be mentioned that the same remarks apply to the Green-leaved, or *Selenipedium* section of *Cypripedium*, now become (through the efforts of the hybridist) a very large group of plants and well within the reach of those who care for pretty and lasting flowers, those of the *Sedeni* class being almost perpetual bloomers.

Culture. The Cymbidiums thrive best in ordinary flower-pots, filled to about one-third with broken crocks. Being strong growers with fleshy roots they require ample pot-room, and, for a compost, equal parts of fibrous peat and turfy yellow loam, with a sprinkling of sand and sphagnum moss. They need a copious supply of rain-water while growing, and the stronger kinds are helped at that season by occasional waterings of very weak liquid manure. All the kinds in cultivation are evergreen and do not need drying off when not actively growing, though a less supply of water at the roots should then be given. An advantage of giving fairly large pots is that the plants escape repotting for several years, and flower all the better for growing undisturbed.

Temperature. A warm greenhouse (55° to 65° Fahr.) or conservatory, or what is called the Intermediate Orchid-house, suits these plants best, but the stronger kinds are so easy to grow that reasonable extremes of heat and cold do not affect them, when once at home in their quarters.

The genus *Cymbidium* was founded by Swartz in 1799 for some true species, with other plants not really belonging to it, and for a considerable time the genus (like *Epidendrum* and *Limodorum*) was made a refuge for Orchids now known to belong to other genera. More recent review with fuller material, has reduced it to a reasonable limit, the main innovation being the classing of *Cs. elegans*, *Mastersii*, and *cochleare*

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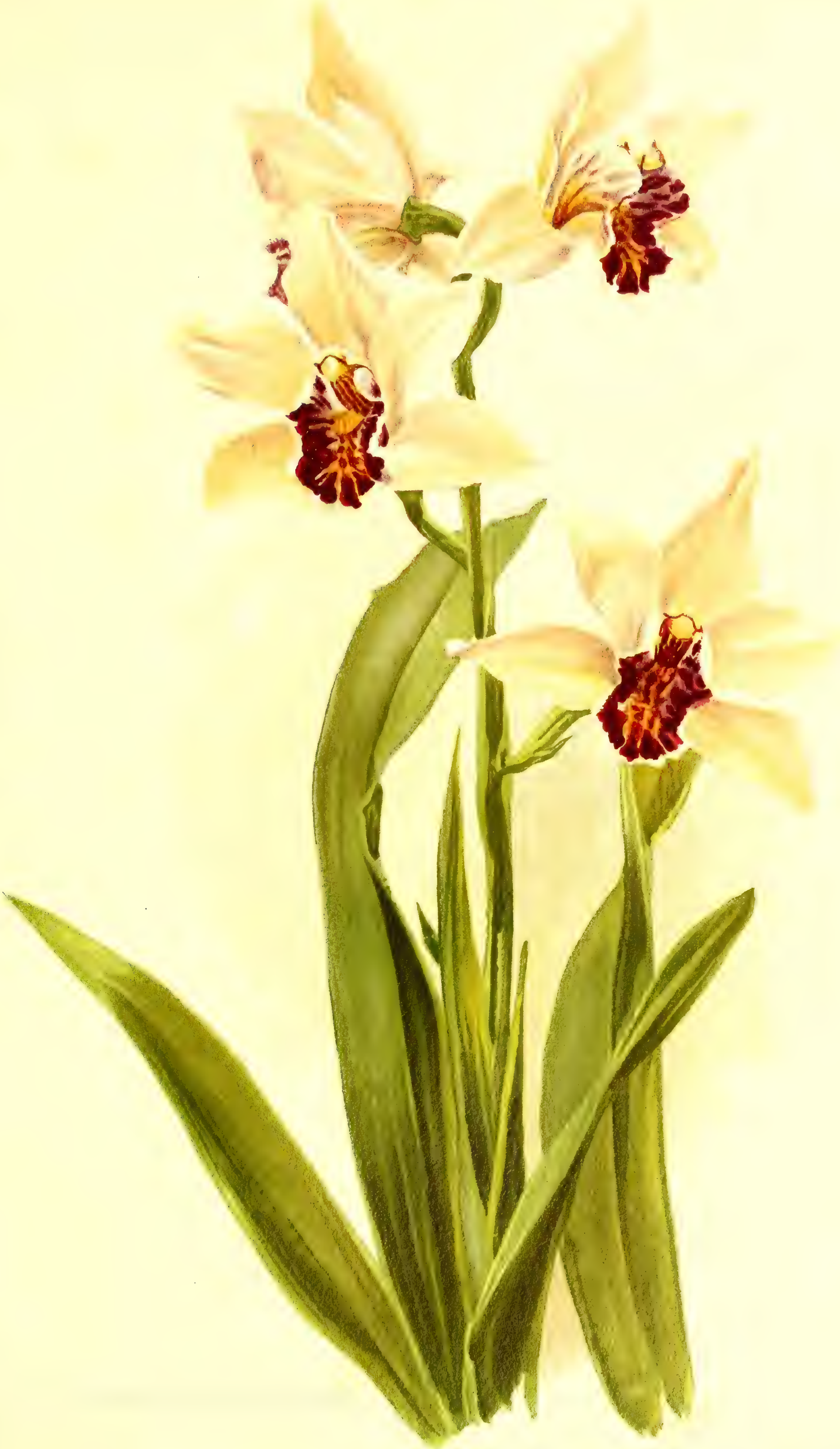
* From a drawing by H. G. Moon in the Nurseries, St Albans.



under *Cyperorchis*. This change is however seldom recognised in gardens, and, as the two groups have produced intermediate forms, it is not important.

Habitat. The genus is widely spread through Australia, Japan, Madagascar, Malaya, and other regions, but interest centres in the strong and free-growing kinds with showy flowers from the Himalayas, Burmah, and the highlands of India. In this section (unless otherwise stated) the growth of the plants is similar. All have ovate, compressed pseudo-bulbs, more or less developed and furnished with bright green, lanceolate leaves, gracefully arranged. They are mostly epiphytic, but—growing as large masses among vegetable deposits or clumps of Ferns—their needs under cultivation approach those of terrestrial Orchids.

Cymbidium Dayanum.—A pretty and graceful kind from Sikkim, with long, narrow leaves, and decurved racemes of white flowers, striped with purplish-crimson. Syns. *C. Simonsianum*, and *C. pulcherrimum*.

C. Devonianum.—Leaves a foot long and broadly strap-shaped: pseudo-bulbs but little developed. Racemes drooping, with many greenish flowers heavily tinged with purple, each flower an inch and a half across. This plant should be well raised or suspended while in bloom. Assam.

C. eburneum.—One of the most beautiful. Spike erect and sheathed, bearing one to three white flowers, sometimes marked with a few purple spots in front of the yellow crest. Flowers 3 inches across. A cool-house species from the Khasia Hills and other highland regions of an elevation of 5,000 to 6,000 feet. While the plant was rare several varieties received names, but large importations have rendered these distinctions of little value.

C. elegans (*Cyperorchis*).—Racemes dense and many-flowered. Flowers 1½ inches long, pale-yellow, sometimes tinged with purple. Disc of the lip two orange-coloured raised lines. Himalaya.

C. Gammieanum.—Flowers yellowish-white with purplish markings. It has been suggested that this is a natural hybrid between *C. elegans* and *C. longifolium*. Sikkim Himalaya.

C. giganteum.—One of the finest large-growing species. Leaves 2 to 3 feet long. Flower-spikes strong, bearing about a dozen yellowish flowers, striped lengthwise with red. Lip yellowish spotted with red, and downy in front. North India.

C. grandiflorum.—A noble species bearing 7 to 12 flowers to the spike, each flower about 5 inches across. Sepals and petals emerald-green; lip white at first, changing to pale yellow spotted with reddish-purple. Eastern Himalaya. Syn. *C. Hookerianum*.

C. longifolium.—An elegant species with long, curving flower-spikes, charged with flowers of 3 inches across and somewhat resembling those of *C. giganteum*. Sepals and petals yellowish, striped with red-brown; lip creamy-white spotted with purple.

C. Lowianum.—The commonest, most useful, and one of the showiest of the genus. Leaves 3 feet or more long. Racemes robust, arching, and bearing 20 to 25 flowers, each 3 to 4 inches across. Sepals and petals greenish-yellow. Lip whitish to buff-yellow, showing a velvety, reddish (often nearly scarlet) front lobe with a whitish margin. The variety *concolor* has uniformly pale yellow flowers, and there are other forms.

C. Mastersii (*Cyperorchis*).—Habit of *C. eburneum*, but with a more slender spike of smaller white flowers, more closely arranged and often 10 or more in number on a spike. Syn. *C. affine*. Khasia Hills.

C. Parishii.—A very rare species originally discovered in Moulmein and by some referred as a variety to *C. eburneum*, which its white flowers much resemble. The main difference is a broader development of the lip, which has purple markings.

C. Parishii Sanderæ.—The subject of our coloured plate and by far the showiest plant of the section, while so widely different from the original form as almost to constitute a distinct species. It was found by Micholitz in the highlands of Annam, French Indo-

China, and sent to Messrs. Sander and Sons who exhibited it at the Royal Horticultural Society in 1904, when it gained a First-class Certificate. Flowers ivory-white tinged with rose, the lip heavily marked with purple.

C. pendulum.—A very old species near to *C. aloifolium.* Leaves hard and thick. Racemes drooping, the yellowish flowers marked with claret-colour, that shade being very pronounced in the variety *atropurpureum.* Himalaya.

C. Sanderi.—A new and handsome plant from Annam, which gained a First-class Certificate at the Royal Horticultural Society on February 14th of this year, when shown by Messrs. Sander. Leaves long and narrow. Erect flower-spikes bearing 3 to 7 flowers of 3½ inches across; colour white, slightly tinged with pink and bearing a few small purple spots at the base of the petals. Lip broad and almost equally three-lobed, the side-lobes folded towards the column, and white beautifully spotted with rosy-purple over the greater part of the surface.

C. Tracyanum.—One of the largest and strongest of the genus, producing very stout racemes of 20 or more flowers, each flower 5 inches across. Sepals and petals honey-yellow, striped with reddish lines shading to chocolate-brown. Lip downy; white or pale yellow, marked with purple.

C. tigrinum.—A very distinct dwarf species with broader leaves than are usual, and graceful sprays of 3 to 5 flowers about 2 inches across. Sepals and petals greenish, marked with red at the base. Lip white, streaked with purplish-brown. Burmah.

C. Wilsoni.—Recently imported by Messrs. Veitch from Yunnan, and very like a dwarf form of *C. giganteum.*

Hybrids. The following hybrids are known in gardens, many of them having ivory-white or yellowish flowers with various brown or purple markings:—*C.* × *Ballianum* (*eburneum* × *Mastersii*; *C.* × *eburneo-Lowianum* (*eburneum* × *Lowianum*), and the reverse cross; *C.* × *I'Ansoni* (*Lowianum* × *Tracyanum*); *C.* × *Lowio-grandiflorum* (*Lowianum* × *grandiflorum*); *C.* × *Lowio-Mastersii* (*Lowianum* × *Mastersii*); *C.* × *Lowgrinum* (*Lowianum* × *tigrinum*); *C.* × *Mantinii* (*giganteum* × *Mastersii*); *C.* × *Maronii* (*grandiflorum* × *Mastersii*); *C.* × *Wiganianum* (*eburneum* × *Tracyanum*); *C.* × *Winnianum* (*giganteum* × *eburneum*).

Other Species. *C. flabellatum* and *C. Humblotii* are plants from Madagascar, the first not in cultivation, the second a fine species with green and black flowers, also known as *C. Loise-Chauvieri.* *C. rhodochilum*, also from Madagascar, a very handsome kind with green sepals and petals, the latter having blackish spots; dark rose labellum, with a yellow crest and dark spots in the middle. A fine coloured plate of this rare plant was given in FLORA AND SYLVA, Vol. II., p. 40. Most of the following species are either well known in gardens or have been recorded:—*C. canaliculatum*, *C. chloranthum*, and *C. madidum* (all Australian); *C. cyperifolium* (Himalaya). This last has an erect flower-spike and is quite different from *C. longifolium*, which usually appears as *C. cyperifolium* in gardens. *C. Huttonii* is a very pretty and rare Javan species. *C. ensifolium*, *C. lancifolium*, *C. Munronianum*, and *C. sinense*,—the last-named Chinese species being an old plant in gardens. *C. cochleare* (*Cyperorchis cochlearis*) an olive-green and brown Himalayan species; *C. Mackinnoni* (India), and *C. virescens* (Japan), bearing solitary flowers; and *C. nipponicum* (Japan) and *C. macrorhizum* (Himalayas) both interesting, leafless botanical species, with scaly rhizomes and said to be parasites, neither of which are in cultivation.

JAMES O'BRIEN.

Harrow-on-the-Hill.

BRACHYGLOTTIS REPANDA.—Writing on this fine shrub in April last I stated that, probably nothing had been lost by its failure to bloom. I must now qualify that statement, for, at the late show of the Devon Daffodil Society at Plymouth, the Rev. A. T. Boscawen, of Ludgvan Rectory, exhibited a large flower-panicle, of about a foot through which had a very graceful appearance, the tiny blossoms in countless numbers reminding one somewhat of *Crambe cordifolia.* This flower-head was not cut from the large plant that I mentioned, this having been blown down shortly after I saw it last November, but from a smaller plant. Mr. Boscawen tells me that the Brachyglottis is excellent for planting beneath trees. S. W. FITZHERBERT.

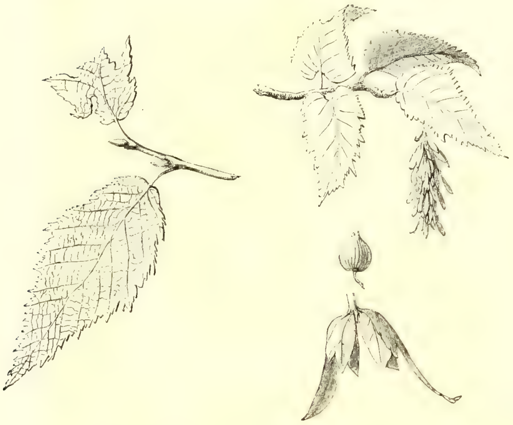
THE GREATER TREES OF THE NORTHERN FOREST.—No. 27. THE HORNBEAM (*Carpinus Betulus*).

THIS beautiful tree is one of the neglected children of the woods. Compared with some countries we have a very limited tree-flora, and it is therefore remarkable that any of our own trees should be so completely neglected by planters as the Hornbeam is. Perhaps one reason is the misusage it has undergone at the hands of continental gardeners, who have trimmed and cut it into all kinds of absurd shapes. We first saw it in a very leprous state at Versailles, and also in some Austrian gardens, where the only trees admitted were those that owing to their texture and close foliage could be clipped into walls. Even in Loudon, a book so full of information about trees, the account of this tree is mostly taken up with puerilities as to the ways of forming these absurd hedges, not a word being said about its natural growth and effect.

The Hornbeam is a native of the southern parts of England but not of Ireland or the north, and it inhabits a vast region in central and northern Europe and Asia. It is more limited in its northern area than the Beech, though it reaches as far north as Denmark, and is also found in the Crimea, the Caucasus, Persia, and Asia Minor, though not in Africa or the warmer parts of southern Europe. It is said in books to like a clay soil, but from our own experience, and judging also by its rarity in the heavy wealden country south of London, it does not seem to like a compact soil, while it is abundant at Epping, on more open soil. Some coolness of soil is no doubt necessary to it. Free sandy loams suit it better than the compact soils of the Weald, nor does it care for very hot ground, any more than for marsh lands, or those of a turfy nature. A tree of the plains and low hills, it never rises much above 1,500 feet in the North of Europe, and only to about 3,000 feet in the extreme south of its area.

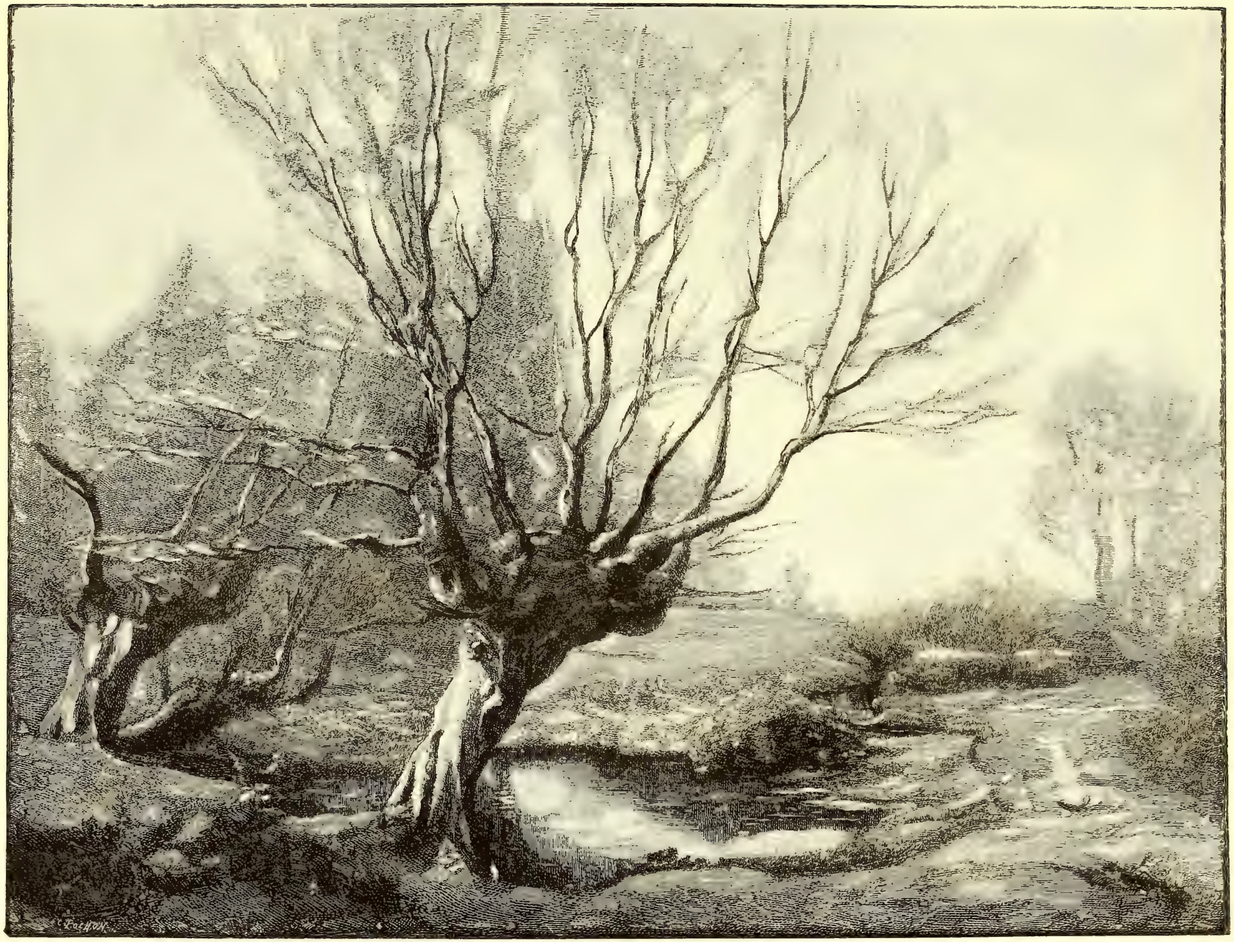
HORNBEAM—FORM OF ISOLATED TREE.

The Hornbeam is not a long-lived tree, rarely lasting more than 100 years, while its limit appears to be about 150 years. The finest trees seldom exceed 70 feet in height, with about the same spread of branch and a stem of 6 to 8 feet round; the natural form of the tree is often spoiled by pollarding. The bark is thin and smooth, peeling off in shreds and changing from brownish-grey or brownish-green in young trees to a uniform grey when older. The tree grows with a thickly-branched spreading crown, evenly rounded and with no leading shoot. It seeds early and at times so freely that the pale-green leafy bracts to which the seeds are attached are more conspicuous than the olive-green foliage; after one of these heavy crops the trees will often rest for two or three seasons. The seeds ripen in October and are like tiny angular nuts, which are very hard and germinate only in the second year, growing best when stratified and sown in April. The tree is almost free from insect pests, resists the roughest winds, yields a grateful shade in summer, and is so hardy as not to fear the sharpest spring frosts. In northern Europe the Hornbeam is commonly found fringing the great Beech forests, in low-lying land where that tree is hardly secure in early spring. The leaves are in great demand as fodder for cattle, whether green or dry, being valued as highly as the choicest forage. The trees should never be cut for this purpose early in the season, else they bleed so freely as to seriously weaken them, but from the middle of July when other food becomes scarce, the clippings of Hornbeam are much sought, and are eaten greedily by the animals. The leaves hang late and often persist all winter, giving valuable shelter, hedges of 20 to 30 feet high being sometimes planted for this purpose in exposed places. Its distribution in Britain is somewhat local, reaching from south-east to north-west and avoiding the west-country almost entirely (in common with the west of Europe) though fairly abundant, especially in coppices, in Essex, Herts, Norfolk, and Lancashire.



Leaf, Flowers, and Fruit of Hornbeam.

Wood. The wood of the Hornbeam is of uniform yellow-white colour, close grained, with minute pores and strongly marked rays. It is hard, very tough, of moderate weight, and with no perceptible sap, yet is not much esteemed owing to its irregular grain and difficulty of working. The trunks of large trees are commonly so twisted and gnarled from the irregular deposition of the annual layers, that they look like several stems run into one, and while the timber is very difficult to split, it is just as hard to work or to make smooth. This cross-grained character, its refusal to polish, and its want of durability, prevents its use except for tools, agricultural implements, and minor uses requiring resistance to prolonged strain or the wear of machinery. For machine cogs and pins, for tools such as planes and mallets, the making of lasts, yokes,



Pollard Hornbeam. (*Engraved for "Flora" from a drawing by H. G. Moon.*)

and pulleys, and the turning of wooden screws and similar objects, it is almost unequalled. In parts of France it is also used for the making of wooden sabots and as hoops for wine-barrels. But its great value is as fuel, kindling readily, burning slowly yet with a clear, bright flame and much heat, until the last particle is consumed. From its wood is prepared one of the purest charcoals, much in demand upon the continent for the making of gunpowder. The wood of pollard trees such as that shown in our engraving, is generally discoloured and of inferior value.

The wood of the Hornbeam being little used for industrial purposes, and on the other hand much in demand for fuel and for making charcoal, it is better to grow it in copses than in woods. In certain conditions, however, it can be usefully grown along with more important trees like the Oak and Chestnut, when, as it forms much covert, it keeps the soil in good order and (apart from any return that it may give) assists materially in the regeneration of the soil by the Oak. Where the soil is sufficiently moist, it may be planted as a nurse for better trees, its own roots never forming suckers or injuring those of other trees. It will disappear gradually in the process of thinning the wood, and as its presence becomes less necessary to the more valuable trees.

Mr. Moon's drawing of the tree was made on a common near St. Albans.

References.—Loudon, Arboretum, vol. 3, p. 2004; Evelyn's Silva, vol. 1, p. 138; Cobbett, Woodlands, par. 306; Selby, Forest Trees, p. 337; Mathieu, Flore Forestière, p. 396; Mouillefert, Essences Forestières, p. 139; Woods and Forests, various notes.

GYPSOPHILA.

In these days when cut bloom plays so large a part in the home, the Gypsophila has taken a foremost place among the hardy plants grown for cutting, its profuse heads of tiny flowers giving grace to various forms of decoration. Many years before it was well known in this country it was valued upon the continent for dried bouquets, but of late years the various kinds have perhaps been as largely grown in this country as anywhere, vast quantities of the commoner kinds being raised for market. In addition to the bolder kinds grown for cutting there are several pretty plants of trailing habit and much charm of flower in the rock-garden, kinds such as *cerastioides*, *libanotica*, *repens*, and *prostrata*, and the pretty little annual species, *G. muralis*. *Gypsophila elegans*, now so much grown for cutting in early summer, is also an annual remarkable for its rapid growth and easily raised in successive sowings to flower before the perennial kinds come into beauty. *Gypsophila paniculata* does not flower until the middle of July, but by growing *Gypsophila Steveni* and *Gypsophila Rokejeka*, both somewhat similar in general effect, the season may be prolonged, *Steveni* flowering earlier and *Rokejeka* a little later than *paniculata*. Where they do well these strong-growing kinds are sometimes too vigorous for the kept border and are then best used for gaps among shrubs or for bold groups of mist-like effect in the wilder parts of the garden.

The Gypsophilas are plants of Europe and Asia, belonging to the Stitchwort family, and numbering 50 to 60 species, of which only a small number are grown in gardens. They are of very slender growth, with scanty foliage and much-branched flower-heads upon which the tiny blossoms hang together upon stems so fine as to have earned the name of Lace Flowers and Summer Cloud. They are all hardy in the free and fertile soils that suit them best, growing freely in open and rather dry places, where they should be let alone as far as possible. The following kinds are in cultivation :—

G. cerastioides.—A distinct hardy kind from the north of India, forming little tufts only 3 inches high which are a sheet of flowers in May and June. The leaves are narrow, about 1½ inches long, spoon-shaped, and covered with fine hairs. The flowers vary a good deal in size and colour but are larger than in most kinds, being about half-an-inch across and freely produced in small clusters. They are white or pale lilac in colour with reddish-purple veins upon the petals and purple shading on the under side, or sometimes netted all over with reddish-purple. A little gem for the rock-garden, it is best planted in broad patches, drooping prettily over bare ledges and growing fast in a sunny place and in deep soil. Seed, and cuttings.

GYPSOPHILA CERASTIOIDES IN THE ROCK-GARDEN.

G. elegans.—A pretty annual species of 12 to 18 inches high, much grown for its delicate heads of rosy-white flowers borne throughout the summer. The plants grow very fast, and for early flowers seed may be raised in heat and the young plants put out in April ; succession is secured by sowing later in the open. Light rich soil and abundant moisture are essential, for the plant is shallow-rooted and soon suffers from drought. By sowing seed in August and keeping the young plants very cool under glass in winter, they may be flowered in pots as early as April and May, and are then useful for the greenhouse and conservatory. Grown in the open the flowers last a long time in beauty and are very effective in the front of the border. They are larger than in *paniculata*, and the stemless leaves are of two shapes, the lower ones spoon-shaped, and the upper ones narrow.

G. fastigiata.—An old kind now rarely seen in gardens, though a native of Europe. It grows about a foot high, with smooth and narrow leaves of a somewhat fleshy texture, and heads of pale red flowers during summer.

G. glauca.—A plant of western Asia, with hairy stems of about 18 inches, bearing narrow and fleshy leaves of grey-green colour, and heads of white flowers. Being few-flowered and somewhat clammy it has never been much favoured in gardens.

G. libanotica.—A pretty little plant of recent introduction, distinct and pleasing for the rock-garden. It makes neat tufts, with grey-green leaves about 1½ inches long, and dainty heads of pure-white flowers during late summer. Syria.

G. Manginii.—A perennial herb introduced a few years ago from Siberia. It forms stout and fleshy roots, silvery grey stems and foliage, and rather large flowers of pale rose-colour gathered into small clusters.

G. muralis.—A graceful little plant from the mountains of Europe and the north of Asia, of annual duration, and pretty for edgings or as low tufts of about 9 inches in the rock-garden. These dense little mounds are of very delicate appearance, the fine stems branched in all directions and covered with narrow leaves and soft pink flowers, which continue during a great part of the summer.

G. paniculata.—The best-known and most useful of all, and a plant quite indispensable where cut flowers are required in quantity. It does best in light well-drained soil and a sunny place, growing 3 to 4 feet high, with narrow sharply-pointed leaves of about 3 inches, becoming smaller towards the tips of the stems. From the latter part of July and through August it bears a cloud of tiny white flowers upon wiry hair-like stems, which serve to set off other flowers, or may be dried slowly in the shade for winter bouquets. The plant is hardy and may be increased from seed or from root-division in spring. It is a good plan to raise a few plants each year, for they do not flower freely until two or three years old, and old plants, after making a great rootstock, often go off suddenly and create a blank. Where much cut bloom is wanted it is possible to hasten a few plants by putting them in sunny and sheltered positions, or where they can be protected by glass-lights for awhile in spring. In some soils it becomes almost too vigorous for the border and should then be planted on warm banks and raised places of the wild-garden. Two garden varieties are now grown, *compacta* being a dwarf form with smaller flowers, and *flore pleno*, a double-flowered form in which the tiny rosettes of pure-white are fully as graceful in effect and far more lasting.

G. perfoliata.—A plant from the south-west of Europe, coming very near *paniculata* but of slightly dwarfer habit, leaves that partially clasp the stem, and rosy-white flowers. It succeeds well even in town gardens. Syn. *G. scorzonerifolia.*

G. prostrata.—A lovely little evergreen trailer with grey-green foliage and white or pale pink flowers in loosely-branching heads throughout the summer and autumn. It thrives in light soil and full sun, and is seen at its best among stones in the rock-garden. Easily raised from seed, but with difficulty from cuttings or division. Central Asia. *G. repens* often does duty for *prostrata* in gardens.

G. Raddeana.—A perennial of very dwarf tufted habit, with small crowded leaves and pale rosy flowers which are lined with darker stripes. Persia.

G. repens.—A little creeping perennial whose trailing stems rise erect at the tips, bearing narrow and sharp-pointed leaves and rather large flowers of white or pale pink which are rather large but not numerous. A pretty little plant for the rock-garden growing about 6 inches high. Mountains of Europe. An improved form of stronger growth with stems of about a foot high, larger flowers, and a very continuous bloomer, is grown under the name of *repens monstrosa.*

G. Rokejeka.—A new and strong-growing plant of 3 feet, with spreading heads of rosy-white flowers coming late in summer. The stems are pretty for cutting but not quite so graceful, from the larger size of the flowers.

G. Steveni.—A perennial kind from the Caucasus, of dwarfer growth than *paniculata*, and earlier in flower. The stems and foliage are of pale grey-green, of spreading habit, with leaves narrow and keeled; flowers white and larger than in *paniculata*, but carried in silvery heads that are smaller and denser. B.

THE NEW FORSYTHIA (*F. europæa*).

This new shrub has recently flowered at Kew for the first time, proving itself fully as distinct from the old kinds as the published descriptions led us to expect. Indeed, we have it from Mr. W. J. Bean that the authorities at Kew are fully satisfied as to its being a true species, coming near *F. viridissima* in its flowers but distinct in habit and foliage, and while the new kind would not appear to be very different in general effect, it is so interesting a plant that most lovers of hardy flowering shrubs will wish to add it to their collections. It had already flowered in America last year, from seed sent out by the late Mr. Thompson of Ipswich some four or five years ago. It has proved itself fully hardy even in the severe winters of the northern States, and is described as a strong, erect shrub of rapid growth, with bright green leaves and large nearly stemless flowers of deep sulphur-yellow, opening from early in April.

From the *Mitteilungen der Deutschen Dendrologischen Gesellschaft* we take an account of this interesting plant. It appears at first sight as unlikely that in Europe of to-day, ransacked from end to end by botanists for generations past, a new shrub should still be brought to light, and that belonging to a group hitherto confined to the far East. But this is explained by the fact that its home is Albania, a part of the Balkan peninsula which has remained the most difficult and dangerous of any region of Europe. In October 1899 Herr Froebel of Zurich received from Dr von Degen of Budapest a little of the seed collected by him in Albania, and from this seed was able to raise a number of plants. The seedlings did well and in the autumn of 1902 were fine shrubs of 6 feet. In the following spring, under the impression that the plants were showing leaf-buds only, they were transplanted with the hope of inducing flower, and after this one plant flowered immediately on the old wood, though with only a few scattered blooms. Their appearance made possible a complete description of the plant, given as follows :—

A shrub of medium height, with numerous opposite upright or slightly curving branches, the younger somewhat angular, the older almost round. The bark is thin, yellow-brown, wrinkled, and hairless. The leaves, in whorls of 2 to 4, are stout, rather leathery, and of two shapes, some being large, oval, long-pointed, and gradually tapering towards the stem, the others small, oval, and almost stemless. All are alike entire at the edge, smooth above and below, with the underside of a paler green. The blooms come before the leaves and are solitary, or two or three together. The buds are folded within brown scales, and the flower-stalks are rounded and hairless. The calix is composed of four oval-lanceolate segments, which are fringed at the edges, and brown in colour shading to purple at the tips, the whole remaining as a part of the seed-vessel. These vessels are of similar shape and almost woody in texture, ending in a short beak, and divided into three compartments containing 4 or 5 long-shaped, almost triangular brown seeds, which are compressed at the sides and slightly winged. The leaves vary from less than two to nearly three inches in length, including the stalk, and the flower-stems are either about the same or a little less long.

The new shrub differs from *Forsythia suspensa* in the stout, somewhat leathery leaf, which is narrower and more pointed, neither lobed nor indented, and tapers more decidedly towards the stalk. The leaf-stalks also are shorter, and the seed-vessels longer in the beak. From *Forsythia viridissima* it differs in the leaf being smaller by one half, untoothed, stouter and more leathery in texture, and also in the shape of the seed-vessel. The same features distinguish it from *F. intermedia* (*suspensa* × *viridissima*), and from *F. Fortunei* and *F. Sieboldi* of gardens, in fact the plant is so distinct in the form and texture of its leaves as to be quite unlike any previously known kind. It is found freely in hedges and as spreading clumps throughout the Orosi district of Albania, near Simoni and Kalyvaria.

So surprising is the discovery of this Forsythia that it has been urged that it must be a strayed form of the Chinese plant, but the following facts point to its separate, or at least very ancient existence in the mountains of Albania. First, its marked differences from previously known species; second, its growth over a great part of the Albanian province of Mirdizia; and thirdly, the fact that it has long been known to the mountaineers and bears a local name. Further, though we have in gardens other older forms of Forsythia, they seldom fruit, this being explained (according to the Magocsy-Dietz theory) by the absence with us of such flower-visiting insects as are suited to their fruiting organs. The fact therefore that the new Albanian species seeds freely is another point in favour of its being a true native of Europe.

ACACIAS IN THE SOUTH-WEST.

MANY tender trees and shrubs of Australia, New Zealand and South America, are grown successfully in South Devon and Cornwall, some of these, such as *Embothrium coccineum*, being objects of great beauty when in flower, but it is doubtful if any family of trees is so valuable for brightening the garden through several months as the Acacias. The climate of the south-west is so well suited to these plants, which elsewhere in these islands can only be grown under glass, that I have met with several kinds doing well in the open. Even in the very warmest spots, however, shelter is a first necessity, for a day's gale may ruin the finest tree. A few years ago there was near the mouth of the Dart at Kingswear, in a spot fully sheltered from the north and east, a good specimen of *Acacia dealbata*, 25 feet in height. At the end of February, when the tree was in bud, a gale from the south blew in from the sea and a few days later it was noticed that the foliage appeared brown and seared. This tree never recovered and died within the year.

Acacia dealbata, the "Mimosa" of the Riviera, is the earliest to flower, and in a very warm and sheltered garden near Teignmouth I have met with it in bloom at the end of January, though as a rule it is at its best towards the end of March. There are many fine trees of this kind, 30 to 40 feet high, in the south-west, notably at Tregothnan and Trebah. In the former garden there is a group planted immediately in front of some Evergreen Oaks, and the effect of the cloud of golden blossoms thrown into relief by the dark foliage of the Oaks is very beautiful. In Cornwall this species is sometimes grown under the name of *A. affinis*.

A. verticillata may perhaps be considered the best of all the Acacias for effect, a large tree in full bloom being such a mass of flower that, at a little distance not a leaf is to be seen and it appears as a pyramid of pale yellow. It is a rapid grower of thick and bushy habit, offering so much resistance to the wind that unless very well sheltered it is more often blown down than any other species. I have known three fine plants of about 20 feet in height, blown down or broken off in the last few years. This species flowers in May and bears rounded flower-heads about half an inch in length. The leaves of this kind sometimes vary so much in different plants that they might easily be taken for different species altogether.

A. armata does well in the open, forming a dense bush 5 to 6 feet in height and as much through. Its bright golden flowers, globular and sweet-scented, are borne in the spring, and its name is derived from its leaves being terminated by thorny points. This kind also varies much in the shape and size of its leaves as well as in habit, giving rise to several named varieties of which the most distinct are *angustifolia* and *pendula*.

A. ovata bears fragrant, globose flower-heads, bright yellow in colour, upon gracefully arching shoots in the spring, but I have seen it still in flower at the end of June. Its foliage is ovate.

A. melanoxylon has reached a height of 40 feet in the south-west, flowering in March and April with pale yellow flowers in great abundance. Its foliage is entire and oblong.

A. longifolia (or a species grown under this name) is fairly common in the south-west, being met with in many gardens. This bears globular, bright yellow flower-heads and its leaves, 8 inches in length and ¾ of an inch in breadth, fully deserve the name *longifolia.* It appears probable, however, that the name of this species is really *A. retinoides*, since the *A. longifolia* grown on the Riviera bears rather rank-smelling, catkin-like flower-spikes springing from the leaf-axils, and is there known as the Caterpillar tree. Whether it be *retinoides* or *longifolia*, there is a variety of this Acacia known here as *floribunda*, this being doubtless due to the fact that some plants of this species are flowerless, while others bloom well in quite a small state. I have known large specimens that never flowered and were eventually destroyed in consequence.

A. cultriformis is a distinct species of loose habit with glaucous foliage, bearing racemes of deep-yellow flowers. I know of two good plants in the south-west, one at Trewidden covering a space of 12 feet by 8 on a wall, and another at Trebah, which covers a trellis 5 feet in height and 6 feet in length in the open ground.

A. Drummondi is a well-known greenhouse plant and makes good growth in the open. It bears cylindrical spikes of pale yellow flowers and has pinnate leaves.

A. Riceana is the most graceful in habit of all the Acacias and, though, as a native of Tasmania it is doubtless hardier than some other species, its slender, pendant shoots render it unfitted for any position from which wind is not absolutely excluded. Its leaves are needle-like and the drooping, cream-white flower-panicles are borne in profusion from the extremities of the thin, arching shoots in May. It is unequalled for draping the roof of a conservatory.

A. cordata is a rather uncommon species with sharply-pointed cordate leaves closely set on long, slender, Epacris-like shoots and bearing small, almost white flowers. This is growing well in the open at Tregye.

A. lophantha is another familiar conservatory plant and one largely used in sub-tropical gardening on account of its elegant foliage, which is, if possible, even more graceful than that of *A. dealbata.* At Trebah there is a plant 12 feet in height and as much through, and at Rosehill, Falmouth, it has attained the same height and bears its greenish-yellow flowers through the winter.

A. platyptera is a singular species possessing no leaves, but having the stems and branches edged with bright green wings, from half an inch to an inch in width and attached continuously throughout their entire length. The bright yellow, spherical flower-heads are borne in the autumn and winter. There is a large plant against a wall at Trewidden, where is also grown *A. paradoxa*, which bears yellow flowers in solitary heads. At Tregothnan I saw the fairly well-known *A. linifolia*, which bears in the autumn pale, creamy, globular flower-heads, and has long, narrow, drooping leaves or phyllodes, as well as *A. diffusa*, *A. calamifolia*, and *A. latifolia.*

S. W. FITZHERBERT.

THE BEECH DISEASE.

To the Editor of FLORA AND SYLVA.

SIR,—Your Beech-tree article made no allusion to the dread disease which, according to some writers in "Nature Notes" is to leave the next generation with only a "picture knowledge" of this grand tree. Until my special attention was drawn to it some two years ago, I had hardly noticed the patches of grey fungus-like appearance on many of the Beech Trees here, but now it is quite clear that the disease is spreading and certainly killing some of the trees. One of these trees I have just cut down (although it might have lasted in a shabby condition for a few more years), and thinking it will be of interest to you I will to-morrow send by parcels post a piece of the bark and a section from one of the highest boughs.

The interesting article on the Arbutus reminds me that when in Victoria, British Columbia, we were greatly struck by the fine trees of the Common Strawberry Tree, and a friend, an architect there, spoke of the great value of the timber for interior work in houses, such as banisters, etc. A. KINGSMILL.

THE CHINESE RHODODENDRONS, WITH A PLATE OF RHODODENDRON AUGUSTINII.*

The close of the nineteenth century and the dawn of the twentieth will be memorable in the annals of horticulture for the number of new plants introduced from China. From the time of Robert Fortune to the late "eighties" little was added to our gardens from Chinese sources. About twenty years ago, however, several French missionaries in China—notably the Abbé Delavay—collected botanical material and sent home seeds of a good number of plants. Among these were several Rhododendrons—such as *R. racemosum*, *R. lacteum*, and *R. Delavayi.*

So far as horticulture (as distinct from botany) is concerned, we may look forward to the results of Mr. E. H. Wilson's recent journeys in China as likely to prove more important than any save, perhaps, those of Fortune. And Fortune was favoured in two respects. He was practically first in the field, and he was able to introduce not only such wild plants as he came across but (what was of more immediate value to horticulture) the long-cultivated plants of the Chinese. As regards Rhododendrons, the only important one he introduced was *R. Fortunei.* There is now at Coombe Wood a great variety of young Rhododendrons, many of them very distinct in appearance, and likely to prove of great importance in the near future. In the following notes I have dealt only with such of the Chinese Rhododendrons (as distinct from Azalea) as are or have been in cultivation. They form but a small proportion of the known species, and even of these several kinds have not yet flowered in this country, but it may be well to bring together such information as is available concerning them at the present date.

On the whole the Chinese Rhododendrons in many respects approach those of Northern India, in fact several species in the one region have an almost exact counterpart in the other. On the other hand not a few are quite distinct from any previously in cultivation, as, for instance, the charming *R. racemosum*, which represents in our gardens a perfectly new type of Rhododendron. We may reasonably hope, too, considering the latitude and elevation at which many of them grow, that they will prove more generally hardy than the Himalayan species.

Rhododendron aucubæfolium.—Although this is described by Dr. Henry, its discoverer, as very rare, Messrs. Veitch have secured it and it is growing in their Coombe Wood Nursery. It is a shrub of bushy habit and of medium size. The leaves are smooth, 6 to 8 inches long by one-fourth as much in width; they are broadest towards the apex, tapering towards the base. The flowers are said by Dr. Henry to be snow-white; they are borne on slender stalks and measure 1½ inches across. The species which is apparently a very distinct one, comes from the Hupeh province, Central China.

R. Augustinii.—The charming character of this Rhododendron is shown by the coloured plate, which gives the white-flowered form and one of the many coloured varieties. It is now cultivated in the Coombe Wood Nursery, and I saw some good plants—probably the finest in Europe—growing in M. de Vilmorin's

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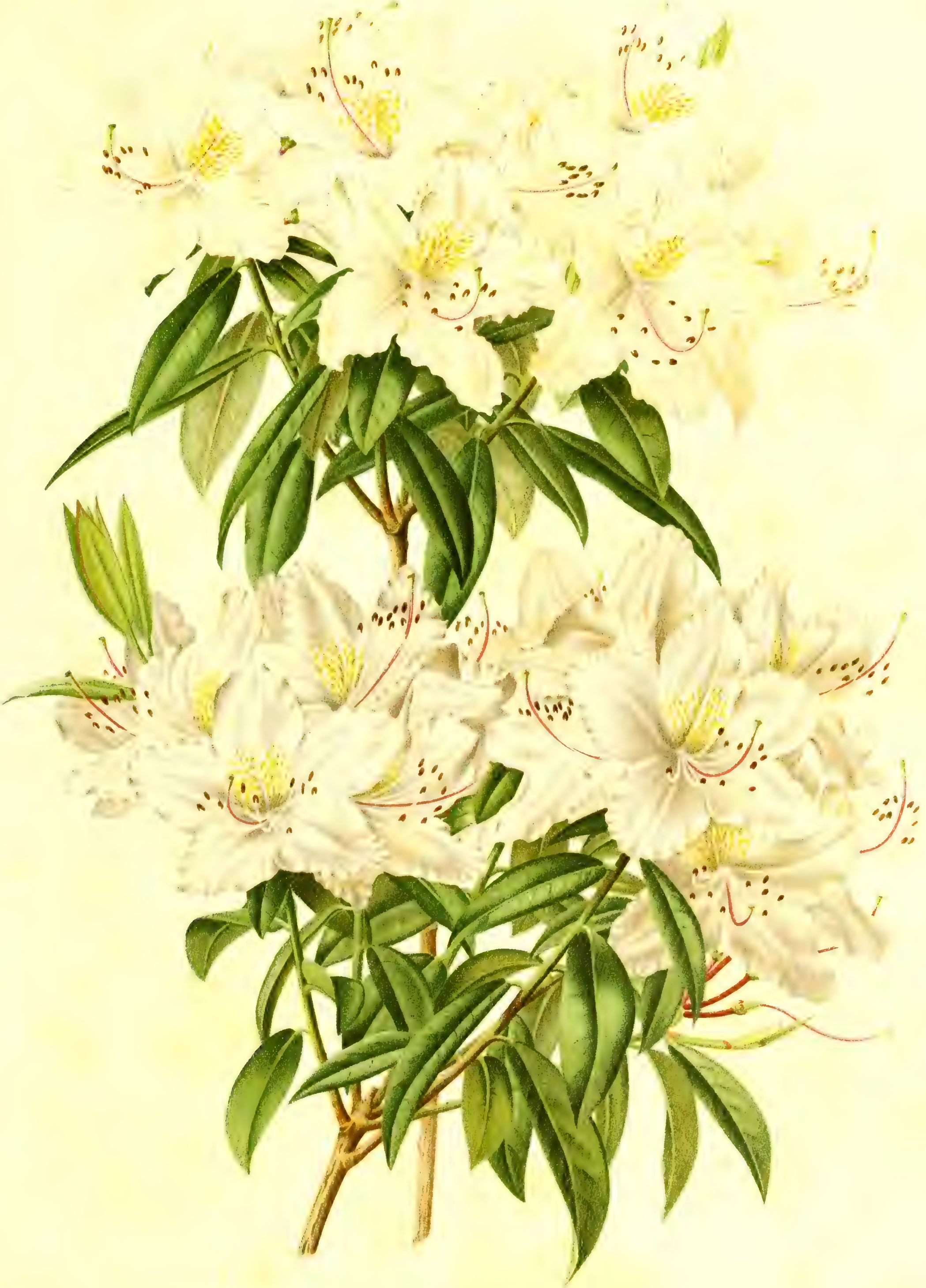
* From a drawing kindly supplied by M. Maurice de Vilmorin.



fruticetum at Les Barres, last July. The picture gives a good idea of the plant, which is of free growth and is described by Dr. Henry (whose Christian name it bears) as anything from 4 to 10 feet in height. The leaves vary from 1½ to 4 inches in length and are always more or less lanceolate. The flowers, each about 2½ inches across, vary in colour from white to pink and pale purple. The widely spread corolla with its wavy margins and soft colouring makes this one of the most attractive of the Chinese species. It is a common shrub throughout the mountains of Western China to the frontiers of Thibet, covering the cliffs which bound the river gorges with verdure and colour.

R. auriculatum.—A native of the Patung district in the province of Hupeh, this plant, like so many others from the same region, was first discovered by Dr. Henry and has since been introduced by Messrs. Veitch. It is apparently one of the most distinct of the new Chinese species. Dr. Henry describes it as of bushy habit though it is said to reach from 10 to 30 feet in height, with leathery, oblong leaves 4 to 9 inches in length. The apex of each leaf is rounded, with a pointed tip, and the base protruded at each side of the hairy stalk into a distinct lobe. The white or rosy-pink flowers are very fine, funnel-shaped, 3 inches deep and 4½ inches wide at the mouth. Mr. E. H. Wilson regards this as one of the most beautiful of Chinese Rhododendrons.

R. Championæ.—Although this species was discovered in Hong Kong as long ago as 1849, it has always been a rare plant, though it has several times flowered at Kew. It is said to grow about 7 feet high and is remarkable in that the young shoots, leaves, and flower and leaf-stalks, are all thickly surfaced with bristly hairs. The flowers are borne in clusters of 4 to 6 together, each flower being 3½ inches across and bright pink. The species is very distinct and handsome, and it is a pity that it does not thrive under cultivation so well as the majority of Rhododendrons. Being tender, it requires cool greenhouse treatment.

R. ciliicalyx.—A well-marked group of the Asiatic Rhododendrons is characterised by bristly-hairy leaves and white flowers. *R. formosum* and *R. ciliatum* of the Himalayan region are well-known members of this group, and to it also belongs *R. ciliicalyx*, a native of the mountains of Yunnan, although in this case the bristles are confined to the stalk. It was discovered by the Abbé Delavay who sent it to Paris, whence it reached Kew and flowered there five years ago. It is a very handsome plant, the flowers being fully 4 inches across, white, flushed with rose. As many as ten are borne in a cluster, making a very fine display. The species is distinguished by the long bristles on the calyx, but it is nearly allied to the Himalayan *R. formosum.* At Kew it is grown in an unheated greenhouse, but may possibly prove hardy.

R. decorum.—Whilst it is not easy to fix on any character to distinguish this Rhododendron from *R. Fortunei*, it is none the less very different and vastly inferior. The habit of cultivated plants is sparse and ungainly, nor does it flower so freely as *R. Fortunei* though its blossoms are equally fragrant and the corolla has seven divisions instead of the usual five. Its foliage is striking, the leaf measuring 9 inches by 4, and being peculiarly thick and rigid in texture; the colour is grey-green with a distinct metallic lustre. As the old writers used to say, it is a plant for "the gardens of the curious."

R. Delavayi.—The close relation of many of the Chinese and Himalayan species is seen in this plant, which is allied to *R. arboreum*—the first of the Himalayan species to be grown in gardens. *R. Delavayi* is found in Yunnan at a height of 8,000 feet, and is likely therefore to prove hardy in many parts of Britain. It flowered for the first time last year with Mr. Thomas Acton of Kilmacurrough, Co. Wicklow, whose garden is admirably suited to the more delicate Rhododendrons. The leaves are 3 to 6 inches long, dark glossy green above, and covered beneath with a pale red tomentum. The flowers are borne in a compact rounded head as in *R. arboreum;* they are 2 inches in diameter and dark red.

R. Fordii.—Though less showy in character, this kind is distinct and not unattractive. There is a good stock of it at Kew and it has flowered there. It was found by a collector of Mr. C. Ford, late superintendent of the Hong Kong Botanic Garden, on the Lantao Island, Kwantung, China. The leaves are obovate, with broadly rounded tips, and taper towards the base; the largest are about 5 inches in length and 2 inches wide, and all are covered with greyish tomentum underneath. The flowers are white faintly tinged with pink, and are rather lax in the truss and 1½ inches across. A shrub of 8 feet high.

R. Fortunei.—It is nearly fifty years since Robert Fortune introduced this plant from the Chekiang province of China, and nearly forty years since it first flowered, but it is still one of the rarest of Rhododendrons. It is a beautiful shrub and one of the finest of the true species that we can grow in the open air. Fortune saw it 10 to 12 feet high, but the largest plant that I know (though there are doubtless larger ones in the country) is in the Rhododendron dell at Kew. This is 9 feet high and 12 feet through and every year is laden with flowers which fill the air with a sweet spicy odour, for it is the most fragrant of true Rhododendrons. Its leaves are smooth, of a paler green than in most kinds, and 6 to 8 inches long. On first opening, the flowers have the petals beautifully crinkled and of a clear pale rose; later they become almost white. An interesting race of hybrids has been raised by crossing this Rhododendron with other species. Mr. George Paul has raised the largest number of varieties, while others have originated with the late Mr. Luscombe and at Kew. This *Fortunei* group is useful as coming into flower somewhat earlier than most garden varieties, thus extending the season of beauty.

R. hypoglaucum.—This is one of Dr. Henry's discoveries in the province of Hupeh and has been introduced to cultivation though it has not yet flowered in this country. It bears rigidly coriaceous leaves, glaucous-white underneath, and measuring (with the stalk) 2½ to 4 inches in length. The flowers are in a loose cluster, and the corolla is 1½ inches in diameter. The plant grows 10 feet or more high.

R. irroratum.—A native of the Yunnan mountains at elevations of 8,000 feet or more, this species may possibly prove to be hardy. It was discovered by the Abbé Delavay who sent seeds to Paris, whence it reached Kew in 1890 and flowered there three years later. Its flowers are borne in a close head 5 or 6 inches across, and are white, suffused and spotted with rose. The corolla is 2 inches long and tubular, expanding at the mouth to 1½ inches across. This is one of the least promising of the Chinese Rhododendrons.

R. lacteum.—The finest example of this species in the country (and probably in Europe) is growing in the garden of Mr. Thomas Acton at Kilmacurragh, Ireland. It is now seven or eight years since I saw it, but even then it was a remarkable plant. Of the older species it comes nearest to the Himalayan *R. Falconeri*, and like that plant it probably takes many years to reach the flowering-state, when raised from seed. It has broad, stout leaves a foot or more in length and of oblong outline; the under-surface when young is covered with a beautiful white felt which becomes brown with age. The bell-shaped flowers are borne in a compact truss, each flower being 2 inches across. It is described as forming woods on the Koulapo Mountains, near Lankong in Yunnan.

R. micranthum.—As the name suggests, this is remarkable for the small size of its flowers, which are only ¼ inch across. Although known for more than half a century it has only recently come into cultivation, and is described as a bush sometimes reaching 20 feet in height with small obovate leaves 1½ inches long, covered underneath with rusty scales. The white flowers are bell-shaped and borne in terminal, many-flowered clusters. It occurs in various localities but is most abundant on the mountains near Pekin.

R. pittosporæfolium.—This plant was sent home by Mr. Wilson during his first visit to China, and young plants are now growing at Coombe Wood. It appears to be a well-marked species in which the leaves resemble some of the larger-leaved Pittosporums. They are 3 to 4 inches long, quite smooth, lanceolate to oblanceolate in outline, and of glossy green. The flowers come in a loose terminal truss and are white, each flower (there being six or more in each cluster) being tubular at the base and 1 to 1½ inches long, expanding into five deep lobes, and measuring about 1½ inches across. Hupeh province.

R. Przewalskii.—About six years ago this plant was sent to Kew from St. Petersburg, but has not yet flowered. It appears to have been at first collected in the province of Kansu in 1872, by the well-known Russian traveller after whom it is named. It has leathery leaves 3 to 5 inches long, and the white flowers are produced 12 to 15 together in a corymbose head. The corolla is bell-shaped with five rounded lobes.

R. racemosum.—The most distinct and so far the most useful of the Chinese species. It is a low shrub, probably never much more than 3 feet high, and is specially adapted for the rock-garden, growing slowly, needing little root-room, and flowering in unfailing profusion. Its leaves are dark green above, glaucous beneath, and vary from ¾ to 1½ inches in length. The flowers are an inch or a little more in diameter, white or pale rose in colour, and slightly fragrant. It is their arrangement however that makes the species so distinct. Instead of being confined to the usual rounded truss so characteristic of the Rhododendron, the flowers come also as side-clusters springing from the leaf-axils. At the flowering season in April, each mature growth is transformed into a raceme of flowers, and hence the specific name. This charming little plant thrives under cultivation as well as any Rhododendron we possess. It is perfectly hardy, can be freely increased by seed or cuttings, and flowers when 2 or 3 inches high. Yunnan, at elevations of 8,000 to 10,000 feet.

R. rubiginosum.—The first time I saw this plant was at Coombe Wood in 1894. It was then a small plant and had not flowered or been identified. Messrs. Veitch sent a plant to Kew where it flowered in 1897 and produced seed. Unless it has been reintroduced recently, this plant is the parent of all those now in cultivation, and although several groups of it exist at Kew it is still very scarce. Although a pretty shrub it is not what nurserymen call a market-plant. It stands stiffly erect, reaching 4 to 6 feet high, with dull dark-green leaves 2 to 3 inches long and broadly lance-shaped. The flowers, produced in small trusses, are 2 inches in diameter and bright rose spotted with crimson at the base of the upper petals. Yunnan.

R. scabrifolium.—This pretty little plant was one of the discoveries of the Abbé Delavay and was first sent to Paris, coming to Kew in 1888 where it flowered in 1890. It is a small, somewhat sparsely habited shrub, its leaves and stems thickly covered with bristly hairs. The flowers, each rather less than 1½ inches in diameter, are white flushed with rose; the corolla is deeply cleft into five flatly-spreading lobes. Yunnan, at elevations of 8,000 feet.

R. yunnanense.—To Messrs. Veitch belongs the credit of having introduced this charming plant to our gardens. I first saw it at Coombe Wood in 1894, and, a plant having been obtained for Kew, it flowered there three years later and was identified. It has not yet ripened good seed freely but can be easily increased by cuttings. In the Himalayan house at Kew it is already 6 feet high, forming a rather thin but not ungraceful shrub, somewhat scantily furnished with leaves. These are 2 to 3 inches long, elliptic-lanceolate and pointed, dark green, and covered with short bristles on the upper surface. The flowers are 2 inches or so in diameter, few in the cluster, white spotted with dark red on the upper part of the corolla. The species comes from Yunnan, and although hardy should be given a sheltered spot. It blooms late in April or early in May.

W. J. BEAN, Kew.

THE NEW INCARVILLEAS.

(To the Editor of FLORA).

SIR,—I consider the May number of FLORA quite the most generally interesting yet issued, and both the colour plates are excellent. I have however found some inaccuracies in the article upon Incarvilleas which I should be glad to notice. By a printer's error it refers to the Incarvilleas as perennial *Begonias*, evidently meaning *Bignonias*, from the reference to handsome climbers in the context. Then as to the statement that seedlings of *Incarvillea Delavayi* flower in the second (or even the first) year of their existence, I do not think this possible, as I got seed from M. de Vilmorin when first sent out in 1893, and this came up very well but not one of the seedlings flowered till 1896 and many not till 1897. I have seedlings of *I. grandiflora* (or *Fargesi* as I think it should be called, having been first sent out by the Abbé Farges) sown in July of 1902 or as soon as ripe, now flowering nicely with three flowers on one stalk 6 inches high; I have not found them to last ten or twelve days however, but about half that time. With me also they come into flower quite a month sooner than those of *I. Delavayi.* I fear we must give up hoping to see the flower of *I. compacta* as I hear from the partner of the late Dr. Regel in St. Petersburg that, though he has grown it for many years he has only once seen it flower, in 1895. When figured in *Gartenflora* for September 1900, Dr. Regel pronounced it to be a form of *grandiflora* and not a true species. I am pleased to read such a good account of *I. sinensis*, as I have seedlings of it up and had heard that it was worthless. I have also a seedling of a cross between *I. Delavayi* and *I. Fargesi*, which should be good. Though about 13 seedlings came up only one of them had green leaves, all the others having their seed-leaves a yellowish-white devoid of chlorophyll or plant life-blood, and therefore could not live. Why such seeds should come up at all is a puzzle and ought to be studied by our scientists. My German friend who effected the cross and sent me the seed, when I reported the poor result wrote me that he had sown 300 seeds and only got 5 green-leaved seedlings. I do not consider either *I. Olgæ* or *variabilis* to be worth growing, having flowered and discarded them both many years ago; their flowers are small and dull-coloured, and never open more than one at a time, no matter how many there may be on the flower-stem. I wish however that I could get seed of *I. Beresowski*, *Bonvaloti* or *lutea*. I see Mr. Wilson has sent Veitch a new Incarvillea, so hope that it may be one of these. I have now the improved form of the golden-flowered Tree Pæony from China—*Pæonia lutea superba*—coming nicely into flower, when I hope to compare it with the original form.

W. E. GUMBLETON.

Meconopsis bella.—Our readers will be interested to learn that that clever grower of rare plants, Herr Max Leichtlin of Baden-Baden, has so far succeeded with this lovely but rebellious little plant of the Himalayan mist-zone, that it is now coming into flower in his garden. We hope to secure a photograph or drawing of the plant while at its best, and some account from Herr Leichtlin of how he has won this cultural triumph.

MESEMBRYANTHEMUMS.

Such uncertainty exists in the names of Mesembryanthemums, that one writes of them with diffidence. In many cases the published descriptions of species are quite unlike the plants grown under the same names in the best collections in the British Isles. The only method by which one can hope to arrive at correctness of name is by sending flowers to Kew, a step that well repays the slight trouble involved. *M. edule*, the plant of our engraving, known at the Cape as the Hottentot Fig, is the commonest kind in this country and grows rampantly in the south-west. In the Isles of Scilly it is a veritable weed, and at Newlyn Harbour spreads a veil of foliage over a wall lapped at its foot by the salt water. Another plant, of which a small portion is shown, grows upon a rocky ledge just outside the mouth of the River Dart, covering 18 yards in length and with a breadth of 14 feet at its widest part. On the right it overhangs a deep fissure filled by the tide at high-water, while in front, at a distance of about 4 yards, the cliff falls sheer to the sea 30 feet beneath. During the many years that I have known it, this example has never bloomed with anything approaching the profusion of flower displayed in the summer of 1904, indeed, even in its native haunts in South Africa, I have never met with it in such a fine condition.

A species bearing far handsomer flowers than *M. edule* is *M. acinaciforme.* This has deep rose-coloured blossoms fully 4 inches across, and does fairly well at Kingswear, S. Devon, though it does not bloom every year. Its foliage is almost identical with that of *M. edule*. Some years ago I brought a scarlet-flowered Mesembryanthemum from the Cape and gave cuttings to the then head-gardener at Abbotsbury Castle. On visiting these gardens a year later I found it in bloom, and it was pointed out to me as being identical with the plant grown there under the name of *M. amœnum*, which, by the way, did not bear the slightest resemblance to the *M. amœnum* described in horticultural dictionaries. *M. tenuifolium* is another very brilliant scarlet, if possible brighter than the last, a large plant in full bloom in the sunshine at Abbotsbury being so vivid that it was difficult to keep the eyes fixed upon it. Both these kinds grow and flower at Kingswear, as do *M. aurantiacum* with deep orange flowers, on plants of which a solitary blossom or two is generally to be found any month in the winter, and species grown under the names of *M. caulescens*, deep red; *M. aureum*, yellow; *M. lepidum*, white; *M. curvifolium*, flesh; *M. inclaudens*, rose; *M. lineolatum*, pink; *M. productum*, rosy-purple; *M. roseum*, bright rose; *M. rostratum*, yellow; and *M. tigrinum*, chiefly remarkable for the fiercely-spined leaves that suggest a tiger's open jaws.

The Hottentot Fig (*Mesembryanthemum edule*). *Engraved for "Flora" from a photograph by S. W. Fitzherbert.*

Mesembryanthemums are not everybody's flowers, for there are few spots in the British Isles where they succeed permanently in the open. Warmth, a porous soil, and nearness to the sea, seem to be necessary to their successful culture. The best collection known to me is that at Tresco Abbey, Isles of Scilly, where 120 species were grown a few years ago. Here peat and disintegrated granite form a porous soil and the little islands are surrounded by the sea. At Abbotsbury Castle, Dorsetshire, there is another fine collection. The rock-garden here is situated just above the Chesil Beach and in westerly gales the flying spindrift must freely sprinkle the plants, but they are plainly well satisfied with their surroundings. In the south-west, on the coast, old plants are rarely killed during the winter, but cuttings are usually taken to replace any old and woody specimens that may disappear through failing vigour. Inland, even only half a mile from the sea, the plants rarely live through the winter, especially if in heavy soil.

S. W. FITZHERBERT.

Flower Names.—It irritates me to see masculine names given to flowers. Why in catalogues should graceful flowers figure so often under the names of soldiers—famous, and brave enough, it may be, but rough; or of savants, whose names bristle with consonants? Ought not every Rose to bear a feminine name?—Alphonse Karr.

BOOKS.

Manual of the Trees of North America (exclusive of Mexico), by Charles Sprague Sargent, illustrated; Houghton Mifflin and Co., Boston and New York. 6 dollars *net*.

This book is welcome to us, for its interest and its use to all concerned with trees. To us the rich flora of North America is precious, for most of its trees are hardy and happy in our country. Some 630 trees are described, and the drawings by Mr. Faxon are sufficiently clear to enable one to identify the species. The descriptions are well done, but, as is the case with all botanical works, the rule is to give first and undue importance to many little features which could be very well shown in small cuts, whilst such things as stature, character, value, and endurance of timber, and the picturesque beauty of the trees when grouped, are too often ignored. A good point is that English names are given; but the omission of synonyms is to be regretted in the face of so many changes of name having taken place, especially of plants known for ages in Europe, under other names than those given in this book. For example, the noble evergreen Magnolia is here given the singular name of *M. fœtida*, when to us in Europe it stands for all that is most grateful in odour and charming in effect. Another good point is the simple, comprehensive index; the author is to be congratulated upon not having followed the common and confusing way of many writers, of having a separate index for the English names, names of places, etc.

The recent discoveries in Hawthorns, here fully described, are amazing. It is difficult to believe that there can be such an immense number of them, no less than 140 pages being devoted to *Cratægus* alone. It would be strange if, among so many, we should fail to find some beautiful kinds for our gardens. A fair example of the author's way of dealing with his subject will be gathered from his description of the White Pine (*Pinus Strobus*) as follows:—

"Leaves soft bluish-green, whitened on the ventral side by 3 to 5 bands of stomata, 3 to 5 inches long, mostly turning yellow and falling in September in their second season, or persistent until the following June. Flowers: staminate yellow, pistillate bright pink, with purple scale margins. Fruit fully grown by July 1st of the second season, 5 to 11 inches long, opening and discharging its seeds in September; seeds narrowed at the ends, ¼-inch long, red-brown mottled with black, about one fourth as long as their wings.

"A tree, while young with slender horizontal or slightly ascending branches in regular whorls usually of 5 branches; at maturity often 100 feet, occasionally 250 feet high, with a tall straight stem of 3 to 4 feet or rarely 6 feet in diameter; when crowded in the forest with short branches forming a narrow head, or rising above its forest companions with long lateral branches sweeping upward in graceful curves, the upper branches ascending and forming a broad open irregular head, and slender branchlets coated at first with rusty tomentum, soon glabrous, and orange-brown in their first winter. Bark on young stems and branches thin, smooth, green tinged with red, lustrous during the summer, becoming 1 to 2 inches thick on old trunks and deeply divided by shallow fissures into broad connected ridges covered with small closely appressed purplish scales. Wood light, not strong, straight-grained, easily worked, light brown often slightly tinged with red; largely manufactured into lumber, shingles, and laths, used in construction for cabinet-making, the interior finish of buildings, woodenware, matches, and the masts of vessels.

"Distribution. Newfoundland to Manitoba, through the northern states to Pennsylvania, Illinois, and Iowa, and along the Alleghany Mountains to eastern Kentucky and Tennessee and northern Georgia, forming nearly pure forests on sandy drift soils, or more often in small groves scattered in forests of deciduous-leaved trees on fertile well-drained soil, also on the banks of streams, river-flats, or rarely in swamps."

The author is to be congratulated on the production of such a handy, practical, and excellent book.

Wild Plants as a Guide to Soils.—The natural vegetation of any given district is often a good guide to soils; but when we take the whole range of the country, differing so much in its rainfall, soil, and other conditions, they are occasionally deceptive. Plants that, in a warm and sunny district may resort to the shelter of woods, will in high and cool districts flourish in the open. Still, we have certain large lines which we are justified in following, and land that will not grow Oaks may yet grow excellent timber trees. Also we have to think that trees may grow and live long in a soil, and never attain perfection in it. Oak will grow anywhere in certain districts, but will not reach a profitable size; and it is a mistake to grow forest trees of any kind where they cannot be grown as profitable timber. Enormous areas of our country are covered with Heather, which often grows in the most barren land; such soil may often be well planted with the hardier Pines and Birches, but often also is so full of acid that Pines will not thrive in it. The common Juniper is an ornamental plant in certain districts of the south of England, but in soil that will not grow other trees well.

FLORA
AND SYLVA.

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IN LILAC TIME.

If the Japanese had Lilacs as varied and good as their Cherries and Plums they would probably have a Lilac festival. The late Sir Richard Owen used to invite his friends in "lilac-time" to his garden at Sheen, and where these lovely shrubs are well done they afford beautiful effects in the home landscape as well as charm in the hand and fragrance. To no family has the harm done by grafting been more injurious than to the Lilac. Everywhere grafted on Privet for the sake of cheapness and ease of increase, it has proved an alliance that they resent by dying. I lost ten years through such a collection, grafted on Privet, that I got from M. Baltet; instead of growing up they grew down and nearly all of them have slowly perished. And so it has been in many gardens where Lilacs have been put in the shrubberies but rarely show their fine value, though so many superb varieties have been raised of recent years. In our country the best results from Lilacs are often seen about farm-houses and in small gardens where the Persian Lilac on its own roots, and perhaps a few common kinds also, are grown. The degradation of the Lilac is best seen in the London squares like Lincoln's Inn Fields and St. James's Square, where the bushes are allowed to run wild but are cut underneath to allow of the useless and ugly digging. When it sows itself in the open the bush naturally takes a pretty habit, but this way of pruning inverts its shape and is ruinous in all ways.

What we have to secure is the full value of the varieties that we now have, with their long racemes beautiful in colour if only well grown. To effect this the first thing is to insist that none shall be grafted on the Privet. The best way to increase Lilacs is by cuttings or layers, or by grafting on vigorous plants of the Common Lilac. Some growers say that they will not grow so well on their own roots, but this is not the case. Seeds of the finer varieties should be sown and in that way one might get strong plants and perhaps some charming new kinds. As to arrangement, the best way is to group our Lilacs in the sunlight: they are too often put away among mixed shrubs where they deteriorate owing to crowding and other causes. No plants more deserve a clear space in the open sun, where they can ripen their wood and be free from the encroachments of coarser neighbours.

Pruning.—Lilacs are too often neglected in this way though few shrubs are better worth pruning, without which they are apt to become a tangled mass of shoots and we do not get the fine full thyrses of bloom that are seen in French gardens. On fading, the flowers should be removed, and the small and weak shoots also if the plants are too "stalky," the aim being to secure healthy and open growth during summer. Cutting back in winter is wrong, because the flowers are produced on the wood of the previous year, and cutting back to a stiff ugly outline does not deserve the name of pruning. To prune is to help the natural shape of the bush and let the light into it, so that it can concentrate its energy on a number of strong flowering-shoots.

Soil.—We read sometimes that the Lilac will do in any soil, and so it may in some districts where the soil is warm and good, as in much of Ireland where the Rouen Lilac, commonly called the Persian, makes such lovely trees. In certain heavy soils Lilacs are slow in growth and do not ripen their wood well or flower so freely as in soils of an open nature. If we are not so fortunate as to possess this open soil we must make it so if the Lilacs are to do well. Cold places in valleys are not so good for them, especially where heavy soil occurs, because being early, the bloom is often caught by late frosts. Therefore, in addition to warm soil we should try and secure positions not too low down and somewhat sheltered. Coming from a warmer and sunnier land than our own—Transylvania and the regions near—very cold soils and situations are against success.

Increase.—Lilacs grow freely from seed, if sown as soon as ripe. Cuttings are best made from the young wood in early summer, struck in sand on a hotbed where they root in six to eight weeks. Layering should be done in early autumn, or suckers may be taken in spring and root readily. When once we have the Lilac on its own roots, increase from suckers is easier than the common nursery way, though some kinds sucker less freely than others. Layers are the best for high-class work. As to grafting, though the Common Lilac is far better than the fatal and ugly Privet, it is not so good as "own roots," for there is always the chance of finding flowers of a choice variety mixed up with those of the common kind. Beside this, where the flower-garden has any such collection of shrubs and flowers as we now possess, the gardener has no time for the labour of watching and removing suckers, which in a rational system of propagation do not trouble him.

The Best Kinds.—Though some of the old varieties were beautiful—even the Common Lilac when well-grown—to have a good Lilac-time it is essential to have the newer varieties raised in France and remarkable for their size, and range of colour. The best are:—

Singles. White—*Marie Legraye*, *Princess Alexandra*, *Frau Dammann*, *Madame Moser*, *alba pyramidalis*. Pink—*Dr. Regel*, *Eckenholm*, *Fürst Lichtenstein*, *Schermerhornii*, *Jacques Callot*, and *Lovanensis*. Dark flowers—

Dr. Lindley, *Ludwig Späth*, *Aline Mocqueris*, *Toussaint L'Ouverture*, *Volcan*, *Philémon*, *Président Massart*.

Doubles. White—*Madame Lemoine*, *Madame Casimir Périer*, *Obélisque*, *Madame Abel Châtenay*. Lavender and blue—*Alphonse Lavallée*, *Président Grévy*, *Lamarck*, *Léon Simon*, *Monument Carnot*, *Condorcet*, *Doyen Keteleer*, *Guizot*, *Marc Micheli*. Dark shades—*Charles Joly*, *Colbert*, *Georges Bellair*, *La Tour d'Auvergne*, *Souvenir de Louis Thibaut*, *Maréchal de Bassompierre*. Rosy-lilac—*Madame Jules Finger*, *Rosea grandiflora*, and *Emile Lemoine*.

THE PAMPAS GRASSES. (*Cortaderia*, Stapf.)

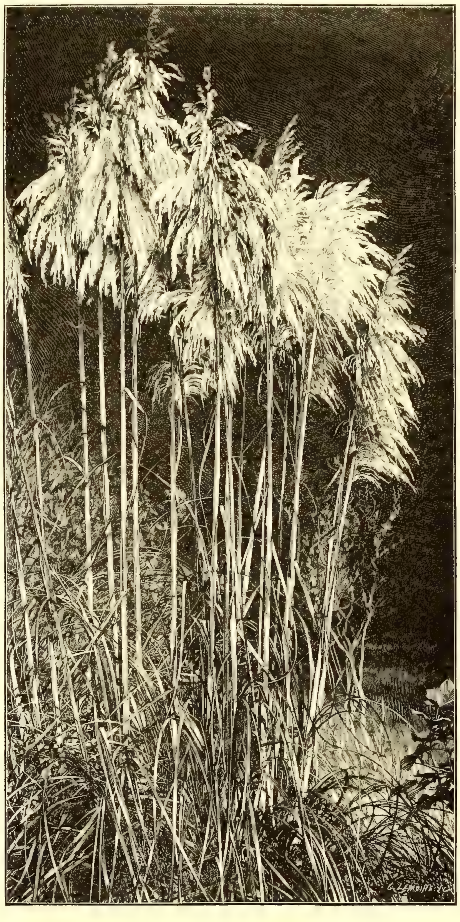
The common Pampas Grass of gardens is familiar to us all. Introduced into this country more than half a century ago, it has remained one of the most ornamental grasses of our parks and gardens. Who would miss its stately silvery plumes, rising on faultless shafts from a large tussock of long, dark-green leaves, slightly twisted and falling in delicate curves? The plumes are late in coming, but when, in the height of summer, the verdure of the garden has attained its deepest, then the young plumes swathed in pale green sheaths emerge from the heart of the tussock where they have long been forming. Borne upwards on the rapidly extending shafts, they slip clear of their tight wrappers and gradually unfold in all their grace of colour and lustre. Each plume contains thousands of small spikelets and each spikelet from 3 to 6 florets, which have lain packed together in the sheath as only Nature can pack. The branches of the panicle and their innumerable divisions are all upright and parallel, pale green and soft, held in position by the sheath. The spikelets are thin, soft, faintly tinged with green, and like the florets, still closed. As in most other grasses, they possess a double outer wrapper which acts as common involucre to the florets and consists of the so-called "lower and upper glumes." Similarly, each floret has its own wrapper of two pieces, a lower and outer one known as the "valve" or "flowering-glume," and an upper and inner one called "palea." Glumes and valves are somewhat similar, but whilst the glumes are quite smooth, the valves are frequently covered in the lower part of their outer surface with long silky hairs, at this stage folded tightly to them. Lastly, each floret encloses a flower proper, built on the plan of the typical grass-flower, save that it is either male or female, and contains the organs of the other sex in an arrested or rudimentary condition. Thus the male flowers consist of 2 little scales (*lodicules*), 3 stamens, and a rudimentary pistil; the female flowers show 2 lodicules, 3 rudimentary stamens (*staminodes*), and the pistil.

As the creased wings of a butterfly emerging from the chrysalis unfold, stretch, dry, and stiffen, so do the parts of the panicle when the flowering stage is reached. The branches and branchlets lengthen, diverge, and stiffen, the glumes spread, the florets gape, and the hairs at the back of the valves rise almost at right angles. In the male plant the fugacious anthers dangle on the tips of long filaments; in the female the small feathery stigmas protrude from the base of the floret. The degree of this expansion varies with the individual—possibly also according to race—and conditions of temperature, light, and moisture. Where the branchlets remain short and erect, stiffening soon, the panicle is compact and rigid, like a distaff. On the other hand it is looser and more graceful in proportion as the parts lengthen and unfold to a drooping and often a symmetrical habit, with the branches hanging more or less to one side. In this process of unfolding the plant can, to some extent, be assisted artificially by opening or pushing back the sheath a few days before it would do so if left to itself. Deprived of their natural support, and not having yet gained their normal rigidity, the branches and branchlets fall apart and droop more readily, and the plumes become loose and fluffy. This little trick is used in the great Pampas-grass plantations of California, the fluffy heads fetching a better price for indoor decoration.

The glumes and valves of the mature floret are delicately membranous; their surface is smooth—apart from the long fine hairs of the valves—and their tissues filled with air from which they derive their beautiful lustre. Sometimes, and particularly in the male panicle, a delicate pinkish hue is also present, which has its origin in small quantities of *anthocyanin*, the commonest colouring principle of red or blue flowers. In misty or wet weather the air in the tissues of the glumes and valves is replaced by water, with the consequence that their lustre disappears, the spikelets close up, the panicles contract or collapse, and though fine weather may follow, they never fully regain their beauty. It is therefore in dry seasons that we see them at their best.

In most grasses the spikelets fall apart or shake away entire as soon as the grains are ripe. But this is not the case with the male panicles of the Pampas-grass, and even the female plumes break up slowly, if their seeds ripen at all, which in this country seldom happens. The plumes last therefore for many weeks even in the open, until the rough winds of autumn break the shafts, and it is this endurance which makes the dried heads so valuable for indoor decoration.

I have said that the Pampas-grass first came to this country more than half a century ago. It was in 1843 that David Moore of Glasnevin received seed from James Tweedie—at that time collecting in the Argentine. Its actual discoverer however was Frederick Sellow of Potsdam, a successful plant-collector who, about 1814, set out to explore Brazil under the patronage of Sir Joseph Banks and Aylmer Bourke—a fact not generally known. Subsequently he travelled with Prince Maximilian von Wied (1815-1817), and in 1819 with Van Olfers of the Prussian Legation. On this occasion he reached Uruguay (or the *Banda Oriental* as it was then called) and discovered the Pampas-grass somewhere near Montevideo. We know nothing more about this discovery, for Sellow was drowned soon after his return to Rio Janeiro, leaving no account of his travels. His collections however reached Berlin in safety, and from them (in 1825) Sprengel described our plant under the name *Arundo diœca*. At that time the grasses were very badly defined, and *Arundo* in particular contained many species with nothing in common save a superficial resemblance. This first name was unfortunate, for Loureiro had already described another grass under the same name ; three years later therefore Schultes proposed the name *Arundo selloana* for Sprengel's *Arundo diœca*. This was hardly suggested before it also was superseded, for in the following year Nees von Esenbeck removed the Pampas-grass from *Arundo* only to refer it to another genus equally distinct —that of *Gynerium*. In this genus it stood for nearly seventy years as *Gynerium argenteum*, until (in 1897) I pointed out the wide differences of habit and structure existing between the Pampas-grass and the true Gynerium—*G. saccharoides*. It is however only fair to state that Lindley remarked, as early as 1851, that these two plants were by no means of the same genus, and Lemaire, relying on this authority, proposed the name *Moorea* for *Gynerium argenteum* (1855). However, no one followed the matter up, and buried in the "Miscellanées" of a horticultural journal, Lemaire's name fell into oblivion and only came to my notice accidentally several years after I had established the genus *Cortaderia*, and when the name *Moorea* had already been used for a group of Orchids. Otherwise I would not have failed to take up Lemaire's name as a tribute to the great Irish horticulturalist. The name *Cortaderia* was suggested by the fact that *Cortadera* is one of the common names by which the Pampas-grass and some of its allies are known in South America, and as, among the specific names which the grass had received, *argenteum* was the most generally known,



CORTADERIA QUILA AT "BELGROVE," QUEENSTOWN.
Engraved for "Flora" from a photograph.

I formed the combination *Cortaderia argentea* for the Pampas-grass.

It is not my intention to describe fully the characters which divide Gynerium and Cortaderia, but I will just remark that Gynerium (of which only one species is known) is a very tall grass with the habit of the Sugar Cane and growing in companies at the waterside. It is a native of tropical America and a good specimen exists in the Victoria-Regia House at Kew. Nor will I for the present discuss whether *Cortaderia* should not take in certain species which are still (though in my opinion wrongly) referred either to *Gynerium* or *Arundo;* in any case the five species which I referred to *Cortaderia* five years ago (no new kinds have been added since) would have to stand as a distinct natural group. They would in any case represent *Cortaderia* proper, and to them I confine myself. They are all similar in general appearance, and although they might be easily distinguished if seen side by side in a garden, they are rather difficult to recognise when dried and trimmed to size for the herbarium, but on such material I have to fall back, as only three out of the five species are in cultivation. In these circumstances I shall need to introduce technicalities, and to understand them I would ask the reader to keep in mind what has been said as to the general structure of the spikelets of the Pampas-grass, the remarks on this point holding good for all the *Cortaderia* proper. The following are the species at present known:—

CORTADERIA ARGENTEA.—Flowering culms 6 to 8 feet high without the plume (in California they are stated to attain as much as 20 feet), uppermost internode 2 to 2½ feet long. Leaf-blades up to 6 feet by 3 to 5 lines. Panicles 1 to 2 feet by 4 to 6 inches, often with the branches directed towards one side, looser, more nodding and silvery in the male, silky and feathery in the female. Spikelets 3 to 6 flowered; glumes very narrow with a long fine point 6 to 8 lines long; valves very similar to the glumes, glabrous or very scantily hairy in the male (hence its more silvery lustre) and densely hairy in the female (whence its silky panicle), hairs 3 to 4 lines long. Staminodes very minute, $\frac{1}{20}$ to $\frac{1}{15}$ lines long, cylindrical, without (or almost without) trace of an anther.

This is the common Pampas-grass of gardens. It varies under cultivation in the size, colour, shape, and looseness of the plume, and also produces forms with variegated leaves. Some of these variations have been named by growers as though they were distinct species or fixed varieties, but as they are usually merely individual variations which do not come true from seed, it seems best to avoid this method of naming. Thus, *Cortaderia Wesserlingii* might be known as *C. argentea* "*Wesserling*," and *C. Stenackeri* as *C. argentea* "*Stenacker*," and so on.

The home of this species is southern extra-tropical Brazil, Paraguay, Uruguay, and the eastern parts of the Argentine, about as far as 40° S. lat. It is mainly found in the neighbourhood of water-courses, in marshes and similar places, but is by no means one of the characteristic grasses of the vast plains generally called "Pampas." The name Pampas-grass, which first appears in "Paxton's Flower Garden" of 1850, can therefore hardly be considered appropriate. I have already traced the history of the plant up to its introduction into this country, whence it soon spread to the continent. Vast plantations of Pampas-grass have sprung up in California, where it was grown for profit as long ago as 1874. The crop of 1889 from the Santa Barbara plantations was estimated at one million plumes.

C. ARAUCANA.—This is only known to me from herbarium specimens. It is evidently a smaller plant than *C. argentea* with slender and shorter culms. Leaf-blades up to 4 feet, by 3 lines wide. Panicles 9 to 15 inches by 2 to 2½ inches, oblong, erect, and very dense, straw to light bronze-coloured in the dry state, very lustrous, almost alike in both sexes. Spikelets 4 to 7 flowered; glumes somewhat broader than in *C. argentea*, prolonged as a very long and fine point 7 to 8½ lines long; valves very similar to the glumes, hairy in both sexes but more so in the female, hairs 2 lines long, middle nerves drawn out into a fine bristle 3 to 5 lines long. Staminodes with very minute short thick filaments, and minute rudimentary anthers.

This is a native of Southern Chili (Valdivia, Chiloë) but nothing is known as to its manner of growth. It is a handsome plant and would make a good addition to our ornamental grasses. The lustre of the dense panicles is exquisite and their colour probably white, the tinge of yellow or bronze in the dry plumes being probably due to the action of time.

C. SPECIOSA.—This is also known to me only from herbarium specimens. Culms rather stout, height unknown, uppermost internode over 18 inches long. Leaf-blades over 18 inches long by 3½ lines wide. (I suspect that the leaves selected by the collectors do not show the full length, but were rather chosen to fit the drying paper.) Panicles 12 to 15 inches long by 2 to 2½ inches wide, oblong, very dense, or (in the male) lax, erect, with an elegant silky lustre. Spikelets 3 to 4 flowered; glumes and valves in this and the following species decidedly shorter than in those first described, glumes 4 to 5½ lines long, ½ line wide, with slender, minutely two-toothed tips. Valves with very slender tips and the central nerve often prolonged as a short bristle, 5 to 6½ lines long in the male, somewhat shorter in the female, hairy, hairs 2 to 2½ lines long. Staminodes with very fine filaments, ¼ line long, and minute but distinct anthers.

C. speciosa is found growing in masses on the banks of rivers and the edges of swamps from the foot of the Cordilleras down to the coast, and from 25 to 38° of S. lat. According to Meyen it forms with the Spanish Cane and the Common Reed, wide and impenetrable beds along the lower Copiapo River, "waving its glistening plumes like silver flags." This species would also well repay the trouble of introduction to our gardens.

C. RUDIUSCULA.—Culms shorter and more slender than those of *C. argentea*. Leaf-blades up to 4 feet by upwards of ½ inch wide. Panicles 12 to 18 inches long and 4 to 5 inches wide, oblong, more or less nodding, often lobed, usually very dense, those of the male scarcely shining, of the female coarsely silky. Spikelets 3 to 5 flowered; glumes 4 to 4½ lines long, up to ½ line broad, with minutely two-toothed tips; valves tapering from a relatively broad base to fine rigid points about 4 lines long, scantily hairy in the male, copiously hairy in the female, hairs stiff, 3 to 4 lines long. Staminodes very small, with thick filaments and indistinct rudimentary anthers.

This seems to be the common species of the Argentine Sierras and the Cordilleras, from 35° S. lat. northwards. It has also been found on the western side of the Andes and ascends to considerable altitudes where it is much dwarfed. Like its congeners it prefers the neighbourhood of water. I know it only from dried specimens, but so far as we may judge from them it is the least ornamental of the species enumerated here, though on the other hand it ought to be the hardiest of all.

C. QUILA.—Culms very variable in height. Leaf-blades very long and up to ½ inch wide. Panicle 1 to 2 feet long, the lower branches much longer than in any of the preceding species, often more than a foot long, very slender, usually flexuous and nodding, loosely branched, the whole panicle silvery or straw-coloured and with a tinge of mauve or purple, that of the male very lustrous, of the female silky. Spikelets 3 to 5 flowered; glumes and valves extremely delicate, glumes very narrow, 5 to 5½ lines long with the nerve evanescent below the tips; valves up to 6 lines long, narrowing to a long fine point, glabrous or very sparsely hairy in the male, copiously hairy in the female, hairs 2 to 2½ lines long. Staminodes very fine, often with clavate tips or very minutely rudimentary anthers.

Common in certain parts of the Andes from Bolivia to Ecuador, ascending to over 12,000 feet. This was originally described as *Gynerium Quila* by Esenbeck, who mistook it for Molino's *Arundo Quila*, which is a Bamboo of the genus *Chusquea*. Subsequently it was redescribed as *Gynerium jubatum* by Lemoine. I transferred it in 1897 to Cortaderia as *C. Quila*, but by an oversight it appeared in the following year as *Cortaderia jubata* in the *Botanical Magazine*. *Cortaderia Quila* is probably the most graceful of all the Cortaderas, but unfortunately it is also the least hardy. It was introduced to cultivation by Lemoine of Nancy in 1876, from seeds collected on Chimborazo by the Swiss traveller B. Roezl.

Kew. OTTO STAPF.

Cortaderia Quila.

We add a few notes upon the behaviour of this rare and charming plant in the warmer parts of our country, for which, as well as for the original of our engraving on p. 173, we are indebted to Mr. W. E. Gumbleton, of Belgrove, Queenstown. He says:—

I have grown this most beautiful and graceful of all its family for about twenty-five years, since it was first introduced by Victor Lemoine of Nancy, who received seed of it from its discoverer—the collector Roezl—from Chimborazo. It has one great drawback (preventing its introduction into general cultivation), which consists in its being unfortunately the least hardy member of its family, as it is unable to bear any severe frost without injury, if not death. When first I began to grow it, it differed from all other varieties of Pampas Grass in having three distinct flowerings in each year: one in July simultaneously with that of *Arundo conspicua* (known to some as the Summer Pampas), another in September, and a third at the end of October. But the climate of the mild sea-board of the south of Ireland has now changed all this and brought about one flowering, soon after the blooming of the Arundo and before that of any other form of Pampas Grass. The peculiarity in which lies its great charm consists first in the beautiful rosy-purple silky sheen of its inflorescence, and then the even distribution of its flower panicles on both sides of the stem, whereas those of all other varieties are either perpendicular, like a fox's-brush, or all drooping to one side. The flower stems are very tall, reaching to an average height of 10 feet, and so many that my plant produced at one time as many as forty-six spikes. No one who has seen a good specimen of this fine plant in its full beauty will, I think, object to its being addressed,

Ave Cortaderiarum Regina gracillima et pulcherrima.

The man who has planted a garden feels that he has done something for the good of the world. He belongs to the producers. It is a pleasure to eat of the fruit of one's toil, if it be nothing more than a head of lettuce or an ear of corn. One cultivates even a lawn with satisfaction; for there is nothing more beautiful than grass or turf in our latitude. The tropics may have their delights, but they have not turf; and the world without turf is a dreary desert.

Charles Dudley Warner.

ZYGONISIA ROLFEANA.*

This plant was first exhibited in the group of Orchids put up by Messrs. Sander at the Holland House Show of the Royal Horticultural Society in June, 1902, when it gained an award of merit. Passing into the famous collection of Sir Frederick Wigan at "Clare Lawn," it is now a large plant with four spikes of flower just showing. It was raised at St Albans from seed of *Aganisia lepida* crossed with pollen from *Zygopetalum Gautieri*, thus constituting one of those generic hybrids which have so increased of late years.

The Zygopetalum or pollen-parent is really only a good and more recent form of *Z. maxillare* (an old kind brought from the Organ Mountains of Brazil in 1829), and it has before figured in generic crosses, as with *Colax jugosus.* A plant of creeping habit, with small bulbs and long narrow leaves, it produces nodding scapes of six or seven flowers of dull brown on a green ground, with a violet-purple lip. The seed-parent, *Aganisia lepida*, is also a fairly old plant, having been first introduced in 1865, though at that time it soon disappeared and has more recently (1893) come to light again from the Rio Negro district of Brazil. It is of more tufted habit than the Zygopetalum, with small bulbs, long grass-like leaves, and tall many-flowered scapes of pure white flowers 1½ inches across.

The hybrid, shown in the plate, is a plant of very robust constitution, and with us has bloomed twice in each year. The ovoid bulbs are about 1½ inches

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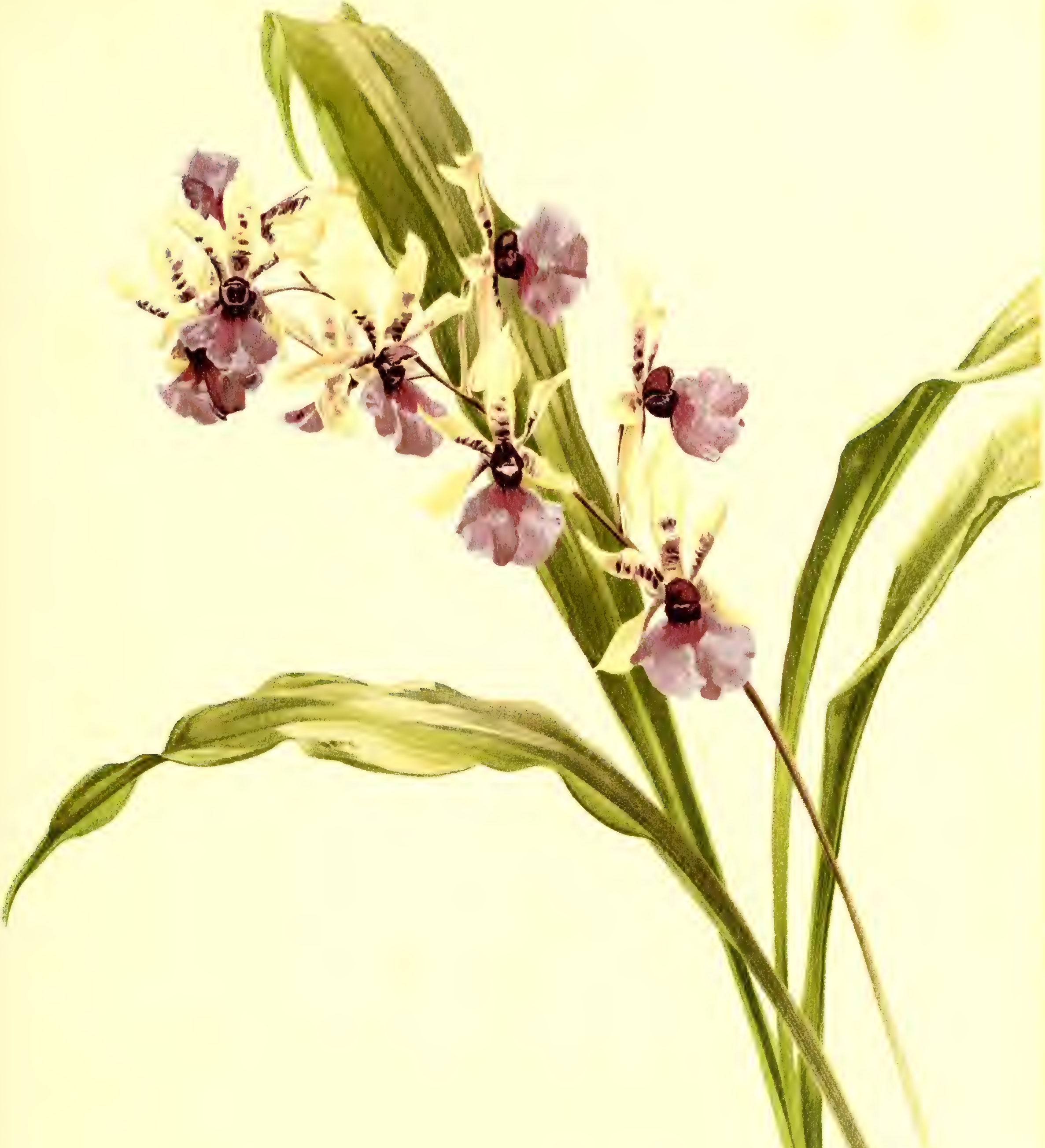
* With a coloured plate from a drawing by H. G. Moon at "Clare Lawn," East Sheen.



long, with five narrow leaves about 2½ feet long, three of which appear at the base and two at the tip of the bulb. The semi-erect flower-spikes are a little shorter than the leaves, coming with them (upon the young growths) and bearing six to ten blooms each nearly 3 inches across and their colour suggestive of the old willow-pattern plate. The sepals are about ½ inch wide, with the petals a trifle narrower and arranged vertically with the dorsal sepal. While young the segments are pale green spotted and splashed with pale china-blue, deepening towards the base. As the flowers age their ground colour whitens and the violet-blue shading softens. The outer surface of the petals has broken lines of pale violet running lengthwise on a whitish ground, and the sepals show a suffusion of the same colour. The lip is broadly rounded and 1¼ inches in width, coloured intense violet in the centre and varied with small patches of white towards the edges which are narrowly fringed with white. The sharply corrugated ridge at the base of the lip, as also the short column, are of deep violet; the under side of the lip is whitish, spotted with bright violet in the centre.

The plant should be grown in a well-drained pan, with a compost of peat, moss, and half-decayed oak-leaves in equal parts, and surfaced with moss. It thrives with the tender Cypripediums, and being in almost constant growth it needs a moist atmosphere and a copious supply of water when the roots are most active. W. H. YOUNG.

East Sheen.

MINIATURE-FLOWERED TUFTED PANSIES.

Except to the enthusiastic lover of the Tufted Pansy not much is known respecting the beauty and charm of the newer miniature-flowered kinds. These originated in the garden of the late Dr. Chas. Stuart, M.D., of Chirnside, Berwickshire, who in walking round his seed-beds in 1887 found what he had long sought—a pure-white rayless self. This chance seedling he named *Violetta*, and for this reason plants of the miniature-flowered type are often called "Violettas." This beautiful plant has given us quite an interesting series of rayless flowers, several of which share the dainty form and refined characteristics of the parent. The majority however are larger and in consequence better fitted for massing in beds and borders. From the many crosses since made by other raisers beautiful sweet-scented kinds have been obtained, and the most recent show considerable advance.

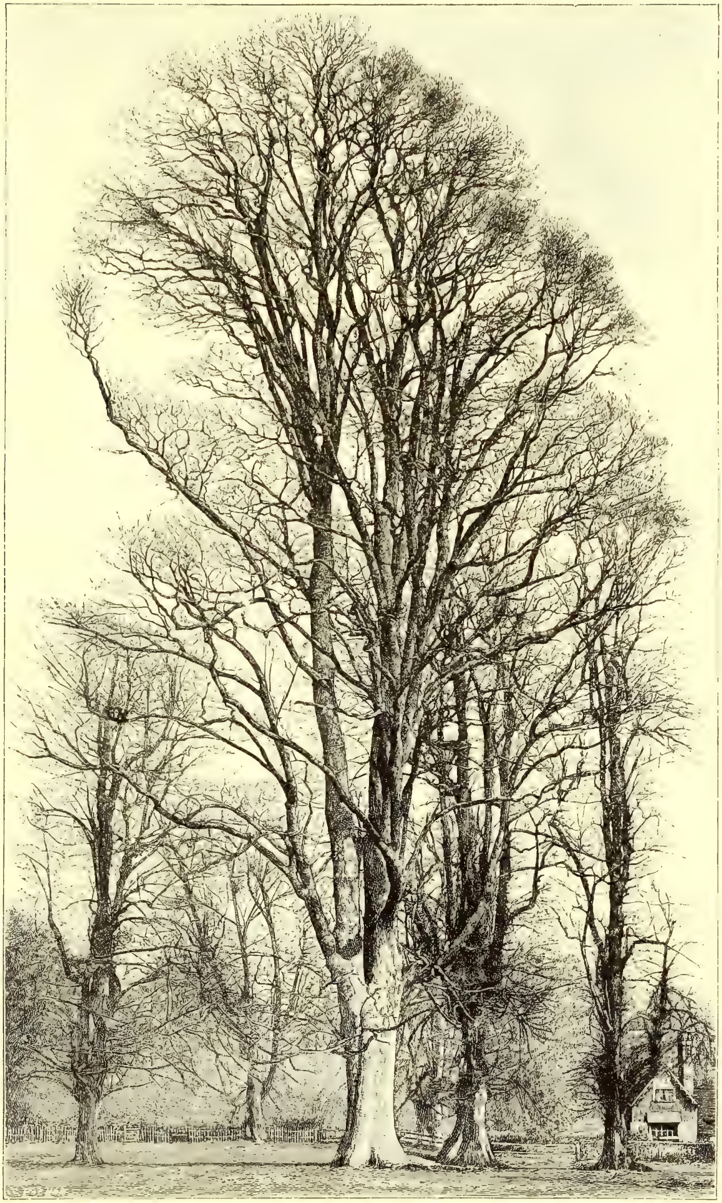
Interest in the Violettas is less general than their beauty deserves, and this is mainly due to lack of enterprise in the trade. The growth of these miniature-flowered kinds is so slow as compared with the ordinary Tufted Pansies that, from a business standpoint, they are not yet a success. The plants do not increase fast enough to suit the trade growers, and the young plants are so small when first sent out that purchasers are apt to be dissatisfied. It should therefore be understood by all who think of growing them, that the plants are specially adapted for rock or alpine gardens, and that instead of getting leggy as so many of the Tufted Pansies do if left alone, these are best left to themselves for two or three years to spread and increase in size and beauty. The late Dr. Stuart assured me that they should remain in the same position for at least two years. At the end of the first year the single shoot planted in the spring will be represented by a little tuft some six inches across, and after a second season's growth the tuft is large and at its best. When in full beauty such tufts are a charming picture and those who have seen the plants in this condition never fail to be pleased with them. Light and porous soil, well enriched with old and decayed manure, is an essential factor to success with these plants. It should also be of good depth, for the Tufted Pansies are deep-rooting, and during hot weather—especially in the south of England—the value of deep culture is soon seen. In addition to the beauty of well-flowered tufts in the rock-garden, the cut blooms make up very prettily for dress-sprays, buttonholes, and vases, these small flowers carrying well where the large petals of other kinds flop about or are too heavy for good effect.

As yet there are not many Violettas catalogued, but of those that have passed through my hands the kinds named below are the most noteworthy. Last season, as the result of several crosses, I raised about a hundred and twenty seedlings, and as these are just coming into flower I am watching their progress with more than ordinary interest. In 1903, owing to the wet and cold summer, it was impossible to get the pollen for crossing purposes, but 1904 amply compensated for previous disappointments and we are now hoping for something new and choice. Good sorts are:—*Violetta*, white with yellowish centre; *Gold Crest*, rich deep golden yellow; *Picotee*, white with picotee edging; *Blanche*, clear silvery white; *Queen of the Year*, china blue, spotted white; *Pigmy*, rosy-purple, very free; *White Dot*, pure white; *Quail*, white, broadly margined bluish-lavender; *Minnie Warren*, pale lilac, very dainty; *Commodore Hutt*, good rayless yellow; *Rock Yellow*, dense yellow; and *Rock Blue*, a charming little deep-blue flower with a yellow eye. D. B. CRANE.

Highgate, N.

THE GREATER TREES OF THE NORTHERN FOREST.—No. 28. THE SYCAMORE MAPLE (*Acer pseudo-platanus*).

A NOBLE and beautiful Northern tree, forgotten too often by planters, perhaps by reason of its freedom to spring up from self-sown seed. So we often see it in a crowded state in shrubberies, and its fine form and stature is only revealed when we stand before such trees as those at Knole House in Kent, and at Penshurst. In many districts of our country, where the soil is free and contains varied mineral constituents, like much of Ireland, Wales, and Scotland, the Sycamore increases so rapidly as to impress us by its effect, but in nature it does not often, like the Oak and other trees, form pure woods, being more often mixed with the mountain trees like Beech and Hornbeam, with which it has more in common as to area and soil. It loves diversified country more than the heavy



SYCAMORES AT PENSHURST, KENT, March 1905. (*Engraved for "Flora and Sylva."*)

soils of the plain, and withstands storms and sea-winds very well, growing high in the Alps of Europe and Asia, and proving the best of summer-leafing trees for our storm-swept shores.

The tree has long been valued by timber-merchants and wood-workers for its many uses, and had it been more widely planted, the woods on many estates would have gained considerably in value. Mr. Batty Langley, M.P., one of the largest timber-merchants in the country, writing lately in the *Magazine of Commerce* upon "Re-afforestation," mentions the Sycamore as one of the "three golden classes of timber" in which no foreign nation can equal us, only that we lack a sufficiency of it. In Ash, Sycamore, and Oak, he says we stand alone in our superiority. One special quality of the Sycamore is that there is little waste in conversion, because the timber is used for many purposes down to its cord-wood—about 2 inches in diameter.

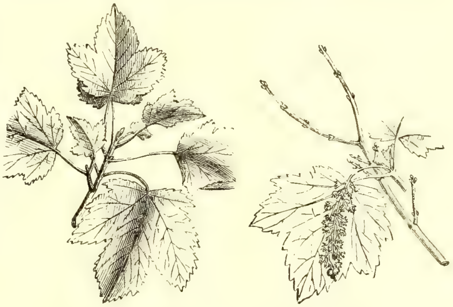
It is strange that so useful a forest tree, which reproduces itself more readily perhaps than any other, should still be so little planted. In 1597 Gerard described the Sycamore as "a stranger to England," but it has had time since then to take the place of other less vigorous species if it had been encouraged. The Sycamore seeds so early and so abundantly, and the seedlings come up so thickly in woods, that the French foresters have come to regard it as the only tree likely to prove dangerous in a forest, if present in quantity. One reason perhaps, why the tree forms but a small proportion of the timber crops in this country is the failure of its wood to last when used out of doors; for this reason it has often been regarded as a weed among forest-trees and rigorously cut down. It is certain that wherever a few Sycamore trees exist and scatter seed, thickets of young trees spring up even among thick bracken which smothers all other seedlings. I know many such self-sown thickets where the trees are dense, clean and straight, 30 or 40 feet high and more, and one of the most valuable facts connected with such examples is that they are rarely injured to any great extent by rabbits, spite of the fact that next to the Ash rabbits prefer the Sycamore, often stripping felled trees from end to end.

About 120 years ago, in his "Practical Treatise on Planting," Marshall predicted a great decrease in the demand for Sycamore-wood as earthenware replaced the wooden bowls, platters, and trenchers till then in use. That he was mistaken is proved by the fact that the demand for Sycamore exceeds the supply, Maple and similar American substitutes being imported in large quantities to take its place. Numbers of large Sycamores are now used in Yorkshire and Lancashire alone, and the finer butts are frequently sold at high prices and carried hundreds of miles. Keighley in the north of Yorkshire is a great centre for this traffic.

The Sycamore does well close-planted, increases very fast in trunk volume, equals the Oak, Ash, or Elm in value up to middle age, and after that exceeds most other trees in its price per foot. I have known mixed lots of timber offered for sale in Scotland, in which the Sycamore trees constituted the main value. In suitable situations the tree is easily and quickly grown to a height of 50 feet or more, and if carefully regulated and not over-thinned makes an almost straight trunk with very little taper. From estimates made at different times as regards age, girth, and space required, I have calculated that a final crop of 200 to 300 trees to the acre might be produced in 50 or 60 years, these being worth—at a low price, and for trunk alone—from 30s. to 40s. each. The price goes up with a bound as soon as the trunk squares 11 inches in the middle, and to secure this girth in the time named a considerable leaf-area is necessary after the height-growth is attained. A very thick trunk is not the most important consideration. The wood is white in young trees, but gets somewhat cloudy with age.

THE SYCAMORE (*Acer pseudo-platanus*).
Form of isolated tree.

As an ornamental tree the Sycamore is superior to the English Elm and is well worth planting in parks, where it forms a large storm-proof tree. It varies considerably in habit and there are four distinct forms—the common green-leaved kind, the purple-leaved with dark-green leaves and purplish-red veins and footstalks, the variegated, and the "Corstorphine" or "Golden Plane." The purple variety is very common in Scotland and is, if anything, the most vigorous grower of the four. All succeed in well-nigh any soil or situation, north and south, but they grow best in deep moist land if not water-logged, moisture at the root being of more importance than a rich soil. Fine trees are none the less found in high and exposed situations on dry rocky soils, and however much exposed, such trees are rarely injured by gales. The Sycamore is more abundant in the north of England, in Scotland, and in Wales, than in the south-country. Westmorland is said to be the home of the Sycamore, and it is certainly plentiful there, the cool damp climate appearing to suit it well. In Yorkshire, Derbyshire, and in Wales large trees are often seen at high elevations in and about farm houses and



SYCAMORE-LEAF AND FLOWERING SPRAYS.

steadings. It is a favourite tree with farmers and cottagers because it quickly grows up and shelters the homestead with its wide spreading top, which affords agreeable shade in summer. There are many fine Sycamores or "Planes" as they are called, in the neighbourhood of Edinburgh, and fine trees of great age and size abound in Perth and Forfar. One or two trees on an estate were blown down during the great gales which swept the north about the time of the Tay Bridge disaster, and I had it from the agent that the butts were sold at about 5s. per cubic foot, to go south. The Sycamore did not suffer to anything like the extent of the Beech and other broad-leaved trees.

Perhaps the finest examples for age and size are at Cassilis Castle on the banks of the Doune, one of the seats of the Marquis of Ailsa in Ayrshire. I have never seen their equal, and what they might be worth from a commercial point of view it would be hard to say, but certainly they would realise a high figure. These trees are all very old, and one in particular, standing near the mansion, has a tradition attached to it according to which it must have been a fine tree with a lofty crown 200 or 300 years ago. The story runs that a gipsy chief abducted the lady of the house in the absence of her lord, who, returning unexpectedly, caught the robber and his entire band at a point on the Doune river known as "The Steps." The outraged husband promptly suspended the lot by the neck, like tassels strung in a ring from the spreading boughs of this tree near the house. This noble Sycamore is one of the most symmetrical I ever saw, with an enormous trunk breaking up at some distance from the ground into a wide umbrella-shaped head of spreading boughs.

Seed is produced in abundance by even young trees, often germinating almost at once, and plentifully the following spring. Stored it is apt to become dry and perish, or germinates prematurely, hence it is better sown as soon as ripe. I have known large self-sown areas that came up so thickly as to overcome everything and yield a nice crop of poles in a short time. The seedlings die off rapidly for the first few years from overcrowding, but the overhead canopy is maintained from the first and so densely as to kill all undergrowth including Elder, which will endure a great deal of bad usage. The quantity of leaf-deposit that forms under a plantation of Sycamore is surprising and soon covers the ground with a thick layer of rich mould in which the roots revel, binding the surface in a network of fine roots. In dry soils and situations this leaf deposit is of great value to the trees, giving a rich dressing and keeping the soil cool and moist.

The tree succeeds in a mixed wood but rather outstrips the Oak and other trees by its more vigorous growth, the Beech being its only effective rival after middle age. Among Firs such as the Scotch, Austrian, or Corsican, it is a bad neighbour, especially on cool soils. I remember some old Sycamores being left in a plantation of Corsican and Scotch Firs, and though the young Pines grew well the Sycamore seed scattered amongst them grew up and overtopped them, and it then became a question whether or not to leave the intruders for the final crop, so quickly did they gain the mastery. Wherever there are scattered trees of fair size, seedlings fit for planting are usually plentiful, and if pulled up by hand while still small and dibbled in where required, every one will grow. It is not a tree which can be kept long in a nursery, for after the second year it outgrows the planting size and, like the Ash, makes a tall wand-like leader which often "hangs fire" for several years after transplanting.

Wood. A recent contributor to the Transactions of the English Arboricultural Society describes the wood as being "yellowish white, with equally distributed vessels. The medullary rays differ in size, satiny and straight; in the Plane they are broad and deeper. The annual rings are fine and distinct. Bark is somewhat scaly, peeling off in sections, which are smaller than those of Plane. The rind remains smooth for a long time." The wood is valued for many purposes, great quantities being used for fancy articles such as nick-nacks and ornamental boxes, for which its light colour, fine grain, and high polish render it particularly well adapted. It is also much used by cabinet-makers, but Lancashire and Yorkshire offer the chief markets, Sycamore being in great demand for bobbin-wood, machine-rollers, and many other purposes connected with the mills. Quantities of this wood are also used for the rollers of washing and wringing machines. Its heat value compares favourably with Beech, when tested under the same conditions. It may indeed be classed as a good fuel, rendering fierce heat which is well sustained, though with little flame or sparkle. For the making of charcoal it is fully as good as the Beech.

J. SIMPSON.

REFERENCES.—Evelyn's Silva, vol. 1, pp. 47 and 193; Loudon, Arboretum, vol. 1, p. 414; Mathieu, Flore Forestière, p. 37; Selby, Forest Trees, p. 14; Simpson, New Forestry, p. 94; Cobbett, Woodlands, par. 400; Webster, Practical Forestry, many notes; Mouillefert, Essences Forestières, p. 203; Woods and Forests, many notes.

NARCISSUS, "COUNT VISCONTI."

THIS is a large form of *N. Johnstoni*, and a clear pale-yellow flower of peculiarly graceful outline, the trumpet of exquisite waxen texture, and a shade brighter in colour than the perianth. This Narcissus combines finish of form, grace, and substance, in a very high degree. It gained an award of merit from the Royal Horticultural Society, and at the great Midland show of Daffodils, when exhibited by Miss Willmott in April of last year.

Lismore, Ireland. F. W. CURREY.

NEW AMERICAN HAWTHORNS.

For handsome flowers in spring, attractive foliage in summer, showy and conspicuous fruit in autumn, the bold habit of branching which is so noticeable in winter, and absolute hardihood, there are very few American shrubs or small trees that can compare with the American Hawthorns. They are adapted to all kinds of ornamental planting and seem to prefer heavy limestone soil, for as far as we have observed, they occur very sparingly in light or sandy soils. Planters have an idea that they are difficult to transplant, but we have handled many plants in all stages of growth and have had very few failures. When moving plants of any size they should be pruned back quite severely, and, given reasonable care in other respects, in two or three years' time they will be objects of great beauty.

Increase.—The seed of the majority of the species lies dormant for two years in the seed-bed. We have found some species, such as *Cratægus matura* and *C. spissiflora*, come quite freely the first season after sowing, and we have seen other kinds lie dormant for three seasons. It is customary, and a good plan, to separate the pulp from the seeds in sowing, as a very much larger percentage will germinate than when the fruit is sown intact. However, as the labour of separating the pulp is considerable, if we have plenty of seed it may be sown as gathered with a certainty of sufficient seedlings for all ordinary purposes. With a small quantity of seed of a valuable kind, the better way is to separate the pulp from the seeds by steeping them in water.

During the past six years a great number of new species of Hawthorn have been discovered in the region around the great lakes, and in Pennsylvania, Illinois, Arkansas, the Carolinas, and Texas. Their classification has been mainly undertaken by Prof. Sargent of the Arnold Arboretum, Boston, though a number of kinds have also been described by Messrs. C. D. Beadle and W. W. Ashe. It was for many years customary for botanists to refer the immense number of Hawthorns scattered over North America to variations of 3 or 4 species: this was an easy way of evading what has proved to be a long and arduous task, for somewhere between 300 or 400 species have now been described. During the past five years the writer has, at the request of Prof. Sargent, given considerable attention to the Hawthorns scattered along the banks of the Genesee River, Buffalo, Niagara Falls, and some parts of Ontario, Canada. In this way the character of over 60 species have become familiar and their specific marks are just as plainly visible as what we know to be the difference between the Silver and the Sugar Maples. In some instances the species appear to be localised but in most cases they are widely distributed and the individuals are remarkably true to character in number of stamens, colour of anthers, size, shape, and colour of fruit, form and texture of leaf, spines, bark, and branching-habit.

The question may be raised as to how these American Hawthorns are to be obtained by planters ? So far as we know, the Arnold Aboretum is at present the only place where the new species of *Cratægus* are propagated, and we believe that Prof. Sargent is gradually distributing them to other arboreta and some of the most influential nurseries throughout the world. We notice that in the latest catalogue of the Lemoines of Nancy 20 of these new Hawthorns are listed, and in the recently issued catalogue of the Vilmorin *Fruiticetum* 150 of these *Cratægus* are included. It would seem therefore that before long the best of these Hawthorns will be offered by nurserymen. We therefore give a brief description of some of the best kinds:—

Cratægus Arnoldiana grows into a tree 15 or 20 feet in height, with ascending branches forming a broad open irregular head. The 10-stamened yellow-anthered flowers are borne as loose, many-flowered, downy clusters, and open towards the end of May. The bright crimson fruit, usually a little longer than broad, ripens about the middle of August and falls by the first of September. *Cratægus Arnoldiana* is remarkable for the early ripening of its finely-coloured fruits in summer or early autumn. We were much impressed with the beauty of this Hawthorn in the Arnold Arboretum, and it is quite extensively cultivated around Boston.

C. Baxteri is a much-branched spreading shrub, with a broad head and 12 to 14 feet in height. It is common on the banks of the Genesee River at Rochester, and seems to extend into Canada and Pennsylvania. The 10-stamened white-anthered flowers in compound clusters, come into bloom about the first week in June, and the orange-red fruits ripen about the middle of October. The leaves are dull bluish-green throughout the season, nearly oval in outline, and always marked by a peculiarly concave surface. This kind is very distinct, handsome, and easily recognised.

C. beata is a spreading, handsome, tall shrub of 15 to 18 feet, and frequently spreads into broad thickets. It is common in the Genesee Valley and extends into Canada. The large saucer-shaped flowers, an inch or more across, with 20 stamens and dark crimson or maroon anthers, come into bloom during the last week in May. The oblong, crimson fruit, full, rounded at the ends, and gathered into large drooping clusters, ripens at the end of September or early in October. The foliage is a deep blue-green and the tree is exceedingly handsome when in flower.

C. coccinoides comes rather near the plant we shall describe as *C. Durobrivensis*, but differs in its dark-grey branches, smaller flowers, thinner corymbs, and the early dropping of its fruit. It is a handsome species, found from southern Illinois to eastern Missouri.

C. Dunbari forms a dense round-topped shrub of 12 to 15 feet, and is common on the banks of the Genesee River at Rochester. The 10-stamened flowers with rose-coloured anthers, gathered into long compound corymbs, come into beauty about 20th May. The large drooping clusters of showy crimson fruit ripen towards the end of September. The leaves are very distinct in outline, oval to almost evenly rounded.

C. Durobrivensis is usually a tall, upright-branching shrub of 15 to 18 feet, with olive-grey stems. It is frequent on the banks of the Genesee River at Rochester, and is also found at Niagara Falls. The large showy flowers, with 20 to 25 stamens and rose-coloured anthers, open in the last week of May. The glowing scarlet fruits ripen about the end of September and hang without loss of colour until the month of January. This persistence of the fruit is very valuable.

C. Ellwangeriana is quite common in western New York and eastern Pennsylvania. It forms a handsome tree 25 or more feet high, with a trunk a foot in diameter and branching 6 or 7 feet above the ground into a spreading head 25 to 30 feet across. The flowers, with 10-stamened rose-coloured anthers, are borne as large corymbs and come into bloom about 20th May. The drooping clusters of lustrous crimson fruits, of oblong shape somewhat rounded at the ends, ripen early in September and fall towards the end of the month ; when just matured their effect is very striking. The leaves are large, oval, and dark green. This kind is associated with the name of George Ellwanger, the well-known nurseryman of Rochester, N.Y.

C. ferentaria forms a tall handsome shrub with stout stems of 15 to 18 feet, and is common in the Genesee Valley. The flowers, with 10 stamens and creamy-yellow anthers, on shaggy, hairy, large corymbs, open towards the end of May. The small fruits of a glowing crimson hang in broad drooping clusters, and are fully coloured from about the middle of September and soon fall. The leaves turn to a fine yellow in the autumn and fall earlier than in most Hawthorns.

C. formosa is a tall branching shrub of 12 to 15 feet, with a spreading head. It is not uncommon about Rochester, Buffalo, and Niagara Falls. The large showy flowers with 20 stamens and white anthers gathered into smooth thin corymbs, come into bloom about the last week in May, and the glaucous fruits ripen in October. The foliage is of a distinct yellowish-green throughout the season.

C. Holmesiana is frequently a tree 30 feet in height, with upright branches and usually forming a broad compact head. It is found from Central New York to Quebec. The cup-shaped flowers, with 5 to 8 stamens and purple-red anthers, open about the middle of May. The bright crimson lustrous fruits ripen and fall early in September. The leaves are yellowish-green in colour, with prominent lobes and long sharp teeth.

C. Laneyi forms a tall shrub of 10 to 12 feet, with slender, spreading branches. This kind seems to be rare, only two or three trees being known in Genesee Valley park, where it was first found. The large flowers with 15 stamens and white anthers, on large corymbs covered with shaggy hairs, come into bloom during the first week of June, and the orange-red fruits ripen in October.

C. pedicillata is abundant from western New York to Toronto. The flowers, with rose-coloured anthers, are gathered into loose long-stalked corymbs which expand about 25th May. The bright scarlet fruits ripen early in September and fall about the middle of the month. The leaves are broadly-oval and rich dark green in colour. Prof. Sargent regards this as "one of the largest and most beautiful thorn-trees of the northern United States."

C. Pringlei is widely distributed throughout western New York and Ontario—Canada. It forms a dense oval compact head, branching 2 to 3 feet above the ground and reaching a height of 20 to 30 feet. The 10-stamened flowers with pink-red anthers open about the middle of May. The dull-red fruits—occasionally marked with yellowish freckles—hang in drooping clusters which ripen about the end of August and fall from a fortnight to three weeks later. This Hawthorn is readily distinguished by its drooping leaves and their convex form, due to the infolding of the sides towards the mid-rib.

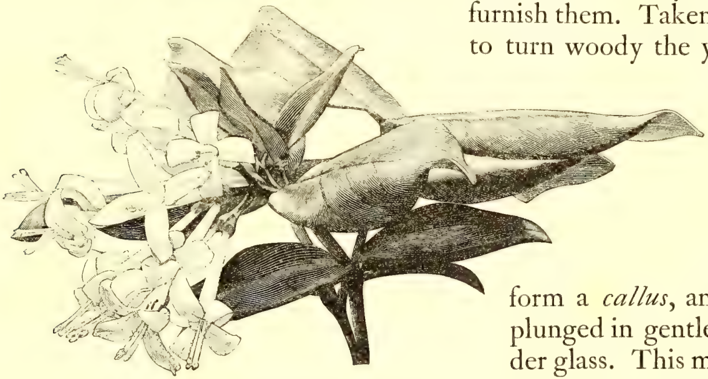
C. spissiflora sometimes attains the size of a tree but is commoner as a shrub from western New York to Toronto. The flowers, with 10 stamens and purple-red anthers, are borne in dense short clusters, and come into beauty just after the middle of May. The bright scarlet almost pear-shaped fruits are borne on short stalks in dense clusters, which begin to colour about the end of August and are not fully ripe till the middle of September. The foliage of this kind is ample and the fruit remarkably handsome when ripe.

JOHN DUNBAR.

In (American) *Gardening*.

PSYCHOTRIA.

A LARGE group of tropical plants numbering at least 500 kinds, which include small evergreen trees, bushes, and perennial herbs, of shrubby, climbing, or twining habit. Though found in almost all the warmer parts of the world they are commonest in Central and South America and the West Indies, while the clumsy botanical name has reference to the medicinal value of certain kinds. Very few of these plants have ever been grown in this country, the best known being the beautiful hothouse plant *Psychotria jasminiflora*, flowers of which are shown life-size in our engraving. Introduced nearly 30 years ago (under the name of Gloneria) it has remained a scarce plant though one of the finest of all stove shrubs in the dazzling purity of its white flowers and their abundance upon plants that are well grown. It is however not of strong growth, needing some care as to management and of difficult increase. The flowers might almost be mistaken at first sight for those of a Jasmine or a white Bouvardia, but they are even choicer than these, covered on the outside with fine white down, and when newly expanded they glisten almost as though frosted. They are in clusters of about a dozen blooms, last a long while, and are beautiful for bouquets and other cut work. Though the plants are never long out of flower, winter and early spring are their best season, and this should be followed by a time of rest in a cooler house. They do best in small pots, for the roots are never very strong and are apt to get out of health if in large pots or planted out. Of erect and bushy habit the plants are seldom more than 18 inches high, with smooth green leaves of about 3 inches long, arranged in pairs and covered with a whitish down on the under surface. Light sandy soil is the best, allowing free drainage with careful watering at all times, particularly in winter. Not only are cuttings very slow to root but they are often hard to get, for the plant blooms so persistently that growing tips are scarce. The best time to watch for them is immediately after the resting season in early spring, when plants that are started briskly are more likely to furnish them. Taken just as they begin to turn woody the young shoots may be dibbled singly into thumb pots, given two or three weeks on a shelf or cool bed of the propagating house in order to form a *callus*, and only after this plunged in gentle bottom heat under glass. This method gives better results than when the cuttings are put into heat at the outset. The failure to bloom sometimes urged against this plant is mostly due to neglect of the resting time. Syn. *Gloneria jasminiflora*.



Flowering Spray of Psychotria Jasminiflora.

A few other good stove kinds such as *Psychotria leucocephala* (better known as *Rudgea macrophylla*) and *P. racemosa* (Syn. *Palicourea racemosa*) have been introduced for their beauty of flower, and *P. cyanococca* and *P. chontalensis* for their charming blue berries, borne much in the same way as in Ardisia and lasting for a long while. Of these and the few other cultivated species we append brief descriptive notes :—

P. capensis.—Though a good many kinds come from tropical Africa, this is one of the few from the Cape region. It is an evergreen shrub or low tree with shining green leaves of 3 to 5 inches long, 1½ to 2 inches wide, tapering at either end. The flowers are small and yellow, followed by clusters of black fruit. Syn. *Grumilea capensis.*

P. cyanocarpa.—A handsome hothouse plant known as the Indigo Berry and much grown some twenty years ago though now seldom seen. It is a shrub of good habit with pale green leaves 4 to 5 inches long, strongly ribbed and prettily crisped around the edges. The dingy green flowers have no beauty but they give place to crowded pea-like berries in clusters of 30 to 40 together, which droop freely from all parts of the plant and continue all winter, the effect of their glossy blue colour being most beautiful. The plant is of easy culture in good light soil, with no care beyond that of other soft-wooded stove plants and a careful look-out for insect pests, to which it is rather subject. It is easily raised from seed (which ripens well in a stove) and from cuttings; the last make plants of better habit and more freely fruiting. Nicaragua. Syn. *P. cyanococca.*

P. leucocephala. — A beautiful Brazilian shrub, perhaps better known in British gardens as *Rudgea macrophylla.* It is of stout, erect growth, sparingly branched, and while of 12 to 15 feet in the gardens of Rio de Janeiro it is often not more than 2 feet high in the stove, with thick leathery leaves a foot long and half as wide, coming upon very short stalks in opposite pairs. The flowers are in large heads of a creamy-white colour borne at the tips of the shoots, the blooms being very like those of the Orange but fully twice as large and useful for bouquets if mounted on wire. They come from December to March when flowers are most valuable and are so thick and fleshy in texture as to last a long time, while the handsome leaves give fine effect even when the flowers are over. Cuttings of half-ripe shoots will root slowly if placed singly in little pots of sandy peat, under glass in the propagating-house. Once rooted the plants are as easily grown as a Gardenia, thriving under the same treatment, with as much light as possible during winter while the flowers are forming. Soil largely composed of peat or leaf-mould is the best, with shade from hot sun and free syringing to keep the leaves clean during summer, and careful watering in winter.

P. pilosa.—This comes near *P. cyanocarpa* but is a stronger plant, hairy in all its parts and very handsome when well grown. The pale flowers are followed by fruits which are larger than in the Indigo Berry, containing sometimes as many as sixty in a cluster, but they are also less glossy and of not quite so fine a blue. Nicaragua. Syn. *P. chontalensis.*

P. racemosa.—A scarce stove plant of 2 to 3 feet, with large oblong leaves tapering towards each end and clusters of small white flowers in early summer followed by peculiar five-angled berries. Guiana. Syn. *Palicourea racemosa.*

P. sulphurea.—A small climbing shrub from the South Seas, with glossy leaves, handsome bright blue flowers borne very freely, succeeded by pale yellow berries. A scarce and beautiful hothouse plant.

P. tabacifolia.—A Brazilian shrub with large tough leaves and clusters of small tubular flowers, hairy in texture and pale yellow edged with red. Syn. *Palicourea discolor.*

P. undata.—A West-Indian shrub with shining undulate leaves tapering to a long point, and stemless heads of tubular white flowers.

AKEBIA.

A small group of twining plants from China and Japan, of which two species—*A. quinata* and *A. lobata*—have been introduced, and of these the last is still little known in gardens. The unintroduced kinds, *A. clematifolia* and *A. quercifolia*, are mostly classed as forms of *A. lobata* rather than distinct species. In the far East the Akebia is as common as our Woodbine, growing wild upon the hillsides and also in gardens. The Japanese call it Fugi-Kadsura-Akebi and use the tough twining stems in the making of wicker-work, and the ripe fruits as food.

A. quinata.—This is not showy, but in the grace of its leaf and long hanging wreaths, its freedom from pests and disease, and its easy culture, there are few finer hardy climbers for the country south of the Thames, and few more useful for the cool greenhouse in districts further north. It is one of those semi-evergreen shrubs which remain green almost constantly in a warm climate or under glass, and its pretty way of growth fits it for use against pillars or archways. The outline of a graceful pillar is often hidden by heavy plants, but this gives a thin veil of pale green leaves, cut into five narrow leaflets and trembling on long stalks. Their colour varies from a pale purplish on first unfolding to a lively green when fully expanded, which deepens gradually until the leaves fall—often not till well into December. For light screens, or a glass roof where filtered sunlight is better than deep shade, there is nothing more useful than the Akebia. The flowers are in loose clusters of deep chocolate colour, in which the sexes are apart and of different sizes, the small pollen-flowers hanging in the upper part of each raceme, while the seed-flowers gathered in the lower part of the bunch are 1 to 1½ inches across (or about three times larger than the male flowers) deeper in colour, and of a waxen texture. Though they mostly open from April to June upon plants in the open air, in mild seasons they often appear in March, or even in February under glass, filling the air with fragrance which is specially marked towards evening. There is sometimes a second crop of flowers later in the summer. The sprays are pretty for cutting and of that firm texture which lasts well in water. The Akebia fruits frequently upon the continent but more rarely with us, though in a warm summer the fact is often reported here and there, especially along the south coast. The seed-pods are about the size of a large oval plum with a thick outer rind, filled with white flesh in which the dark-brown seeds are embedded. The colour of the fruit varies with different plants and with the degree of ripeness, passing from greenish or brown to pale grey, violet, or deep purple with a delicate bloom. When fully ripe the flesh becomes soft and pulpy and of pleasant flavour, but this stage is seldom reached in this country.

Akebia Quinata in Flower.

Culture.—Of the easiest culture in warm gardens of light soil, the Akebia is less happy where the ground is cold and heavy. In the first case it will grow well facing east, but where conditions are less favourable it must have a well-drained spot in the full sun, for if the wood fails to ripen there are few flowers. These come on side-spurs of the old wood, so that what pruning is needed should be done in summer, in the cutting away of unruly shoots which should be so thinned and shortened as to allow air and sunlight to reach every part of the plant, which, having no tendrils, climbs by twining and will twine round and round itself if neglected. Though often trained upon walls or a similar flat surface, a better way is to find a place amongst hardy evergreen shrubs or low trees through which it will thread its way, hanging in graceful festoons from the upper branches where its beauty is seen to the full, and where it is better protected than on a bare wall. It is in this way that it roams about in the hedges and wayside trees of China and Japan, where it is so fragrant that its sweetness first led Fortune to the spot where it was growing. The best-used plant I have seen was trained lightly over the rail of a bridge, spreading thence into the low trees which overhung the water, to fall again in fragrant, gently-swaying trails. This old plant had run a long distance in this way, for though the books give 10 to 12 feet as the normal growth, 30 feet or more is not uncommon under good conditions. A tasteful way in which to use it is with one of the early white Clematis, for though the flowers will not always come at the same time, the two mingle prettily and when they do open together the effect is charming. The plant is readily increased from cuttings, layers, root-cuttings, and division. The first way is most used, the best cuttings being the wiry half-ripened side-shoots, taken in spring and rooted in gentle heat. Suckers often come from the base of strong old plants, and if taken with a few roots soon make good plants. Old plants should have an annual dressing of good soil or decayed manure. The fragrance of the Akebia is not easy to define; the description "cinnamon-scented," perhaps, comes nearest the truth.

A. lobata.—Introduced only ten years ago this kind is still rare but bids fair to become fully as useful as *quinata*. It differs from it mainly in its leaves composed of only three leaflets which drop earlier in the autumn, though this is atoned for by their pretty purple tint before falling. They are pale green in colour with a bluish tinge underneath and are borne upon long slender stalks, while the oval leaflets are again divided by short footstalks. Beside being frankly deciduous, the growths are stouter, more woody, and less graceful than the old kind, though fully as hardy and even more vigorous in growth. The flowers also are smaller and gathered into long slender racemes of 3 to 6 inches, in which the tiny male flowers are far more numerous and pale purple; the seed-flowers are few, and as in the other kind are much larger and deeper in colour. They come at the same time of the year and very freely, indeed this kind will be covered with bloom when *quinata* fails completely at its side. It also fruits more readily, numerous instances having occurred in various parts of the country since 1900, when it first bore fruit in the houses at Kew. While in the older kind even the single fruits are uncommon, in this they often come in clusters of three together, arranged roughly at right-angles to one another and about 3 inches long by 1½ wide. Their colour is a pretty pale violet, and when borne freely the effect is very pleasing. When fully ripe the pods split open along the underside, showing the rows of black seed in the white pulp. B.

THE MOTHER-PLANTS OF THE GARDEN RANUNCULUS

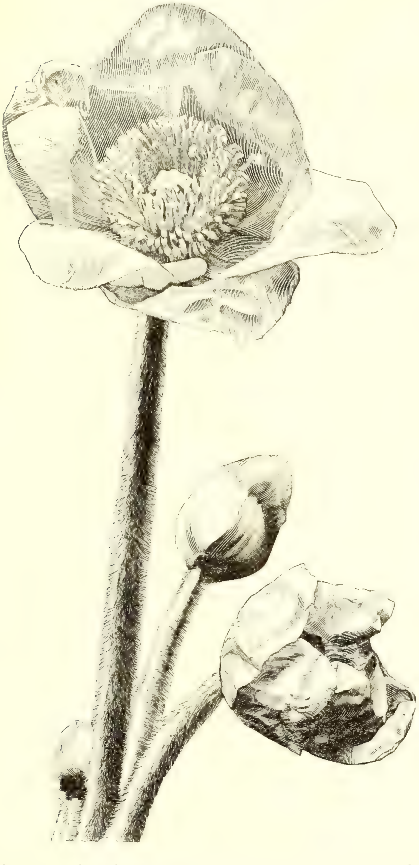
The origin of the beautiful forms of Ranunculus so long grown in Dutch and English gardens as the Turban, Persian, or other races, is not commonly known, but they spring from the beautiful wild Buttercups of Palestine and North Africa, where we have seen both yellow and red forms in great beauty and in many places as common as the Poppy Anemone. The point of interest for us is that these single flowers are often more beautiful than the popular double forms, though they have never been brought into cultivation. We found that a few we brought over perished in our heavy soil, but better results might follow in hot, sandy, and valley soils. In this connection the following notes by Mr. Arthur Sutton are interesting:—

The whole way from Jaffa to Jerusalem (except on the mountains of Judea) and thence northward through Samaria and Galilee as far as the foot of Mount Hermon, this Ranunculus is one of the commonest wild flowers. I have occasionally seen copper-coloured and yellow forms, but these are not nearly so common as those of the rich red colour which I had at the Hall. The *Anemone coronaria* flowers two or three weeks earlier than the *Ranunculus asiaticus*, and the plains which are in places crimson with the Anemones, become equally beautiful when the Anemones go over, with the Ranunculus which follows. Both seem to be equally at home in the same spots. The English tourists have seldom if ever seen the single Ranunculus, and therefore both plants are generally called "Anemone" by travellers. The Anemones of Palestine are mostly of deep scarlet or crimson colour, but in certain localities (when riding through the country from Jerusalem to Damascus) we frequently met with patches where every shade of colour from white to purple could be found. The average height of the Ranunculus in Palestine is 9 to 14 inches, and of the Anemone 10 to 15 inches, and the flowers of both are always single.

This single-flowered Ranunculus is figured in Sibthorp's *Flora Græca* and in the *Theatrum Flora*, where three forms, the white, yellow, and scarlet, are shown.

THE NEW YELLOW MECONOPSIS (*M. integrifolia*).

Readers of Flora and Sylva will be interested in comparing the engraving of Messrs. Veitch's form of *Meconopsis integrifolia*, which appears on this page, with Miss Mary Wroe's painting of my plant which appeared in the issue for last March—vol. 3, p. 80. I have several specimens of Messrs. Veitch's plant here at Neston, but I have never seen it in flower; it seems however that there are very marked differences between the two forms. In breadth of leaf; in the character of the hairs; in the presence or absence of a style below the stigma, they are unlike. I regret however that the engraving does not bring out what seems to me the most evident and important difference from a garden point of view, viz., that in my plant each flower is absolutely alone on a single stem, whereas in Messrs. Veitch's form a single branched stem bears a number of flowers springing from the leaf-axils at varying heights.



In view of these things it seems reasonable to ask if these two markedly different plants are both really *Meconopsis integrifolia*. My only authority is that the packet of seed from which the plants were raised was sent me from the St Petersburg Botanic Gardens, and bore this name. It may easily be that Dr. Fischer de Waldheim's able lieutenants had only travel-injured dry specimens to deal with, or perhaps not even these, and had to rely chiefly on descriptions. In any case the matter will soon be settled, as I have sent one of my only two remaining plants to Kew. The other is here and can easily be distinguished from a number of Messrs. Veitch's plants among which it is growing. In view of the real beauty of the plant it is almost ungrateful to add that *Meconopsis integrifolia* in the form which I have seen here, seems to me less attractive than *M. paniculata* or *M. Wallichi*, and that I should not dream of comparing it with the peerless *M. aculeata*.

A. K. BULLEY.

Neston, Cheshire.

SOME NEW DAFFODILS.*

The flowers shown in our plate are the most remarkable among those raised by Mrs. Backhouse, of Sutton St. Nicholas, near Hereford. In a few notes upon her gains the raiser confines herself to the question of parentage as being of primary interest to lovers of the Daffodil, to whom the details of crossing and culture are already familiar. Mrs. Backhouse informs us that the large pale *Backhousei* "*Lord Kitchener*," the giant *Leedsii* "*The Fawn*," and the "*Czarina*," were from seed of the large *Ajax* varieties crossed with forms of *N. Leedsii*. "*Dewdrop*" is from a form of *Leedsii* crossed with *poeticus*. In one small batch of these seedlings the flower-cups vary in length from almost the disk-like crown of *N. poeticus* to the long trumpet-form of *Ajax*. Their high standard of excellence is no less remarkable than their variety in shape, some ninety per cent. of the whole being good and fairly good, instead of two or three plants in a hundred, the usual percentage of those worth keeping. They are all prolific seed-bearers.

DEUTZIA.

Were it only for their gains in this one group of hardy shrubs, plant lovers would owe much to the Messrs. Lemoine of Nancy, who for years past have gathered all the available species and carefully crossed them with one another, producing a series of hybrids beautiful in colour and varied in form and habit of growth. Even with our wealth of early flowering shrubs there is ample room for the soft shades of carmine, rose, and purple which these new Deutzias offer us, though to see them at their best the plants must flower naturally in the open air, forced plants losing much of their colour. Such distinct kinds as *kalmiæflora*, *discolor grandiflora* and *purpurascens*, and the rosy forms of *gracilis*, are worth a place in every collection of hardy shrubs, though they are at present very little known even in nurseries, the well-flowered plants shown at the meetings of the Royal Horticultural Society during the spring having passed almost unnoticed through no fault of their own. To see them in the open is worth a visit to Kew, and though it cannot be said that they are well cared for, they were very beautiful last year. This year the frosts have been unkind to the earlier varieties, though the forms of *discolor* are both very good and very little injured. Though *Sieboldiana* seems to come very near *scabra* it appears to be distinctly earlier at Kew, as well as stouter and more vigorous in growth. The arching sprays of *gracilis carminea* are charming in bud or when fully open, and though without colour *gracilis Boule de neige* is an excellent plant for effect when grouped. *Deutzia Lemoinei*—one of M. Lemoine's early gains—is not always good in the open from failure to expand if the weather is unfavourable. It is however well worth flowering under glass, forcing readily and fully as free as *D. gracilis*, while finer in habit and in leaf.

Though, as he explains below, M. Lemoine has failed completely in crossing *D. crenata* with any other kind, he

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* With coloured plate from a drawing by H. G. Moon.

[illegible]

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(in conjunction with M. Maurice de Vilmorin) has given us several late-flowering kinds to keep it company during June and early summer, thus extending the early glories of the shrub-garden. For their late flowers, *D. Vilmorinæ*, *D. myriantha*, and *D. corymbiflora* in southern gardens, should find a hearty welcome, and the good account given by M. Lemoine of his new crosses with *corymbiflora* seems to promise other good things for the future.

Deutzia Myriantha.
Engravea for "Flora" from a Photograph.

Much of the following is translated from a monograph of the family compiled by M. Emile Lemoine and officially honoured by the National Horticultural Society of France. To the author we are further indebted for notes upon the newer plants—*Deutzias Vilmorinæ*, *myriantha*, etc.—of which little is yet known in this country.

Deutzia corymbiflora.—A shrub of 4 to 5 feet, thickly branched and of graceful habit. The young growths of the season are erect, rounded, and long in the joint, with bronzy-green bark covered with tiny white hairs. The leaves, 5 inches or more long, have little stem and are pointedly-oval in shape, more or less heart-shaped at the base, and edged with short, fine teeth; their texture is rough on both sides, the upper surface deep green coated with short hairs, the underneath paler, set with star-like hairs, especially upon the veins. The mature growths of the previous year carry massive, much-branched clusters of white flowers, with often 50 to 100 buds and expanded blooms. They open from the latter part of June, while thanks to the number of buds the effect is almost as brilliant at the end of July as at the outset. It sometimes happens, too, that on reaching full size in autumn the young growths bear a few small heads of flower, without injury to their mature beauty in the following summer. Though this beautiful shrub is apt to be cut to the ground in severe winters, it always grows again. It was raised from seeds sent from W. China to M. Maurice de Vilmorin; these grew so freely as to show bud at the end of the first year, and flowered in April of 1896 in a Parisian nursery, being shown before the French *Société nationale d'Horticulture* in the following year under the name of *D. corymbosa*. Syn. *D. corymbosa* of gardens, and *D. setchuensis* of Franchet.

At the outset much difference of opinion existed as to the identity of this plant, which was variously pronounced to be the *D. corymbosa* of Brown, and the *D. parviflora* of Bunge. Without going fully into the facts adduced by M. Lemoine in justification of his own name, suffice it to say that he concludes that, while coming near *D. staminea*, and in a less degree related to *D. corymbosa* of Brown, this plant cannot rightly be classed with either and its origin is therefore best recalled by the name *corymbiflora*, as suggesting that under which it first appeared. The plant was sent out by Messrs. Lemoine and Boucher in 1897, and a form known as *corymbiflora erecta* has also appeared, differing from the parent in its slighter and more erect habit, its longer, narrower leaves, and its smaller heads of flower.

HYBRIDS OF D. CORYMBIFLORA.—A number of seedlings raised between *D. corymbiflora* and *D. discolor purpurascens* are still on trial, and promise good results. Though it is still too early to speak of them with certainty, M. Lemoine tells us that some of these plants were objects of great beauty during the past summer.

D. corymbosa.—A plant from the mountains of Nepaul, and not yet grown in Europe. Its leading features seem to connect it with *D. parviflora*, the flowers being of fair size and composed of smooth and rounded petals. This plant is the *D. corymbosa* of Brown, and should not be confused with the *corymbosa* of Lindley here referred to as *D. staminea* or the *corymbosa* of gardens here treated as *D. corymbiflora.*

D. crenata.—A plant of many named forms, of which few are really distinct. A common shrub in gardens, it quickly forms dense tufts of 6 or more feet in height, with rough stems of the thickness of a pencil. The leaves are pointedly-oval, rounded at the base, with very short stalks, hard, rough, and crisped in texture, hairy on both sides, dark green above and paler beneath. The flowers appear in June, hanging from the leaf-axils in a multitude of erect thyrses; each flower is composed of five pointed petals, more or less turned back at the edges. Introduced by Siebold from Japan, where it grows freely in the hedges of sandy places. This plant is quite hardy at the root, though occasionally cut to the ground in severe winters with loss of one year's beauty.

VARIETIES.—Among the many forms of this plant are:—*crenata flore puniceo*, with white flowers shaded on the outside with rosy-purple; and *crenata flore pleno*, brought from Japan by Fortune about 1866, and distinct in its very double flowers, prettily tinted with rose upon the outer petals. *D. crenata flore albo pleno* is a seedling raised in Van Houtte's nursery in 1868, differing from the last in its snow-white flowers: simultaneously the same plant appeared as *D. crenata candidissima plena*, raised by Froëbel of Zurich. The plant known as *D. crenata Pride of Rochester*, raised fifteen years later in America, is really a repetition of this earlier double form, already twice-named; nor is this surprising, seeing that seeds of *D. crenata* give rise to a variety of forms. Several variegated kinds are also grown, such as *foliis albopunctatis*, with leaves speckled with white; and *foliis variegatis*, in which they are streaked with yellow. Forms may also be met with which are mere repetitions (under another name) of those already described. Thus *D. crenata scabra*—the common *D. scabra* of gardens—is not in any way distinct from *crenata*, and the same remark applies to *D. crenata Sieboldi*, often called simply, *Deutzia Sieboldi.* More distinct is *crenata Fortunei* (otherwise known as *D. Fortunei*), a plant of Japanese origin, with handsome and showy clusters in which the flowers are much expanded; it forms large tufts, free from the stiffness of *crenata*, and of charming effect when full of flower during June. Two other seedlings, sent out about 1887 by an English firm under the names of *D. Watereri*—with white single flowers, flushed with rosy-lilac on the outside; and *D. Wellsi*—with double white flowers—claimed to be crosses between Deutzias *crenata* and *gracilis.* In regard to this supposed origin M. Lemoine says:—"We have frequently tried to cross *D. crenata* with other species of the genus, but without the least success; even the most carefully guarded seed produces nothing but forms of *crenata.* This plant is so common in gardens that, even when the hybridised flowers are sealed in gauze coverings, it is well-nigh impossible to completely shut out the pollen brought by wind, by bees, and by ants. Our own complete and frequent failure made us more than a little sceptical with regard to these supposed hybrids, and an examination of their flowers shows no trace whatever of hybrid origin." A more recent form is *crenata macropetala* (or *macrosepala*) which appeared only a few years ago, with flowers very large and long, pure white, and thickly massed in the clusters.

D. discolor.—Though a form of this plant has been in cultivation since 1891, the true *D. discolor* has only recently been introduced from China, the first living plants having been sent to France, where they flowered in the collection of M. de Vilmorin. Since then plants have reached Messrs. Veitch from their Chinese collector, and these bloomed last summer at Coombe Wood. *Deutzia discolor* is a charming little shrub with arching, wand-like shoots of 2 to 3 feet, crowded from base to tip with compact clusters of rose-flushed white flowers, each measuring $\frac{3}{4}$ of an inch across. The leaves are lance-shaped, 2 to 3 inches long, dull green in colour, with toothed edges and the rough surface found in some other Deutzias. This plant is not yet in commerce, but a form of it, now well-known in gardens, is *Deutzia discolor purpurascens*—a shrub of 3 to 4 feet, with slender, rounded stems of bronzy-green or red colour, covered with little starry scales. Oval leaves of $1\frac{1}{2}$ to $2\frac{1}{2}$ inches, upon very short stalks, finely toothed and crisped around the edges, and dark green above with a paler under surface—from whence its name of *discolor*. The leaves distinguish it at once from other Deutzias, in which they are of greater length. The axillary flower-clusters also are erect and often gathered into more or less spreading heads, upon short, reddish-brown stems. The flowers, 6 to 8 in each cluster, are widely open, erect, and rounded. The dark green calix is well developed, and covered with white scales; the petals are much folded or wrinkled, slightly toothed at the edges, and clear rosy-purple colour on the outside, showing within as a pretty flush. Before opening, the buds are of a decided carmine.

This plant was first grown at the Museum, Paris, from seeds gathered in the mountains of Yunnan, Southern China, by the Abbé Delavay, flowering in Europe for the first time in May of 1891. Among the seedlings much variation was apparent in habit, vigour, size of flower, and the depth of colour in the buds and outer petals, but so far as we are aware, none of these forms have appeared in gardens. This truly handsome shrub is apt to be cut down by hard frosts, which destroy even the woody shoots; fortunately it is quickly renewed from the root.

Hybrids of D. Discolor.—These are crosses with *D. gracilis*, and, having *D. discolor* as seed-parent, the resulting seedlings are nearer that kind; the named hybrids are :—

D. discolor floribunda.—A little plant of upright growth, and so free that when in full beauty little save its flowers can be seen. These appear as erect panicles, with a faint rosy flush on the outer petals and the buds, the inside of the wide-open flowers being pure white. Messrs. Lemoine consider this one of the best of their seedling Deutzias.

D. discolor grandiflora.—In this the influence of *gracilis* appears in the long leaves, borne upon stiffly erect shoots. The flower panicles are longer than in *purpurascens*, and the flowers larger, covering the stems throughout their length with rosy-tinted blossoms.

D. gracilis.—A small, bushy shrub, of many slender stems, set with deep-green lance-shaped leaves, narrowed to a point, toothed at the edges, and (while young) covered on both sides with stellate hairs. The snow-white flowers appear during May as long erect clusters at the leaf-axils. Discovered by Siebold in the valleys of Japan, this plant was first grown by J. Baumann of Ghent, in 1850, when a coloured plate of it was published in the *Flore des Serres et des Jardins de l'Europe* (Vol. VI., 1850 and 1851). It thrives in light sandy soil, and is valued for forcing, its pure white flowers and tender green being useful for cutting and decoration early in the year. The few forms known in gardens differ only in their foliage; they are—*foliis aureis*, with yellow leaves; *aureo marginata*, in which the leaves are edged with yellow; and *albo marmorata*, in which they are marbled with white.

Hybrids of D. Gracilis.—On the appearance of *D. discolor purpurascens* Messrs. Lemoine crossed it with *D. gracilis*, using it both as a pollen and seed-bearer. In the first case the hybrids resembled *D. gracilis*, and in the second *D. discolor purpurascens*, but in both cases they have proved perfectly hardy, and untouched even by late frosts. Those related to *D. gracilis* are as follows :—

D. gracilis rosea.—A dense shrub of 3 feet or more, hardy and free flowering. Its growth is erect, with small and narrow leaves and a profusion of erect sprays of widely bell-shaped flowers, which are rose-grey on the outside and a soft fresh carmine colour within. 1898.

D. gracilis venusta.—A medium-sized and bushy plant, with narrow, pointed leaves, and large snow-white flowers, crisped at the edges and shaped like an Azalea in miniature. 1898.

D. gracilis campanulata.—A tall and bushy shrub of slender brown stems and dark green leaves; long sprays of large milk-white flowers, widely bell-shaped, and displayed upon fine black stems. 1899.

D. gracilis carminea.—A bushy shrub with slender shoots, dark green leaves, flowers of medium size crowded into long sprays, and soft pale rose in colour, deepening to carmine on the outside. A charmingly graceful plant, its slender shoots gracefully arched beneath their load of bloom. 1900.

D. gracilis eximia.—Comes nearest to *D. gracilis*, its brown stems being covered with leaves of dark bronzy-green ; flower-heads rounded and erect, the flowers upon very slender stems, widely expanded, frilled at the edges, and their colour pale rose on the outside, milk-white within, and bright pink while in bud. 1901.

D. gracilis multiflora.—A seedling of dwarf, almost creeping habit, thickly branched and spreading. Its short, erect stems are completely covered with white flowers.

D. kalmiæflora.—A cross between *D. discolor purpurascens* and *D. parviflora*, sent out by M. Lemoine in 1900. It is a hardy little shrub of 3 to 4 feet, with stout erect stems and a diffuse head, set from the middle of May by spreading clusters of about a dozen flat and rounded flowers, an inch across, and of pale silvery-rose colour, deepening towards the edges of the petals which are daintily waved and crisped. The outside of the petals and the buds are a bright rose-lake colour, while the peculiarity to which the plant owes its name is the ring of petal-like stamens forming a raised disk in the centre of the flower, after the manner of a Kalmia. It is a very distinct plant, branching freely and gracefully, and unlike any other Deutzia.

D. Lemoinei.—A cross between *D. parviflora* and *D. gracilis*, raised by Messrs. Lemoine in the spring of 1891. It is a hardy little shrub flowering early in May and as good for forcing as *D. gracilis ;* in the open its flowers are at times injured by late frosts, when in cold or exposed places. As regards general aspect it is intermediate, the stems being more erect and woody than in *gracilis*, while shorter, more branched and regular than in *parviflora*, and the leaves lance-shaped and finely toothed. The same blending is seen in the flowers, borne freely at every joint in erect and branching clusters, sometimes rounded and at others cone-like, but quite distinct from the flat clusters of *parviflora*, or the long sprays of *gracilis*. The clusters contain about 15 flowers, ¾ of an inch across, and composed of broad white petals which are prettily waved around the edges. 1895.

FORMS OF D. LEMOINEI.—*D. Lemoinei compacta* is dwarfer and more bushy than the last, with smaller flowers of great purity produced in many fair-sized clusters, and of great effect because fully displayed. This form is specially good for pots. 1897.

D. Lemoinei "Snowball" (*Boule de Neige*).—Though of the same origin, this comes nearer to *parviflora*, with stems that are stiffer and stouter, and leaves that are rough in texture. The bloom appears mostly at the tips of the branches as compact, rounded heads of large flowers, broad petalled and of great substance, with waved edges and creamy-white colour, relieved by stamens and disk of pale yellow. A good kind for grouping in the open air. 1899.

HYBRIDS OF D. LEMOINEI.—*D. Lemoinei "Avalanche"*.—Whereas the two last-named plants are mere forms of *D. Lemoinei*, this kind and the two following are of more complex origin. This little shrub is supposed to be a recross with *D. gracilis*, its stems being densely clothed with small, dark-green leaves and a profusion of crowded flower-clusters upon short stalks, the combined weight causing the stems to arch very prettily. The flowers are pure white and of medium size, composed of flat, oval petals, and so hardy as to be quite untouched by late frosts.

Crossed again with *D. discolor purpurascens*, *D. Lemoinei* has given two further hybrids of great beauty :—

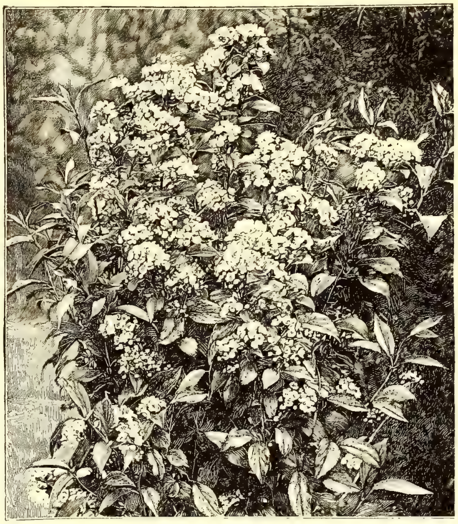
D. Lemoinei "Apple Blossom" (*Fleur de Pommier*).—A little shrub of erect growth, with rough-surfaced leaves of medium size, finely toothed at the margin. The stems, of about 2 feet high, are laden with rounded clusters of 20 to 30 flowers, springing erect from every joint. The petals fold back prettily, with margins fringed and waved, and their colour passing from rose in the bud to blush-pink, paling to white when fully expanded.

D. Lemoinei "Roseball" (*Boule rose*).—A little shrub of 2 to 3 feet, and almost a counterpart of the last save in the size, shape, and arrangement of its flowers. These are so numerous as to almost hide the foliage, their profusion and its good habit of growth, making it useful for forcing. The flowers open towards the end of May, and are of blush-pink with yellow stamens, the red flush deepening at the edges, and on the outside of the petals.

D. myriantha.—Another of the Lemoine crosses, coming from *D. corymbiflora* crossed with *D. parviflora.* It is a charming little shrub of slender growth, with brown, erect stems covered with long, narrow leaves of dark green, with a roughly hairy surface. The massive, much-branched clusters open early in June, with flowers $\frac{3}{4}$ of an inch wide and of snowy whiteness, save for the pale yellow stamens. The charm of the plant is enhanced by its following earlier kinds, while coming into beauty from a week to a fortnight before its parent *D. corymbiflora* and so much hardier as to remain uninjured when that plant has been frozen to the ground at its side.

D. parviflora.—A handsome shrub of 4 to 5 feet, its erect stems crowned in spring by heavy white clusters like those of the Hawthorn, or certain Spireas. It is a very distinct plant, in which the bark peels away from the woody stems in bands. Though seemingly smooth and bare at first sight, the young stems are hairy under the magnifying glass. The leafstalks, which are fairly long and grooved upon the upper surface, carry leaves of 2 to 4 inches, pointedly-oval and deeply and irregularly toothed, the teeth being tipped with brown ; the dark green of the upper surface is paler underneath, and the texture dry and rough, with prominent veins, and a few minute hairs. The flower-heads are borne at the tips of the shoots, in April and May. Though perfectly hardy, the buds appear so early as sometimes to suffer from frost. The flowers are white, nearly half-an-inch across, and hairy upon the outside of the petals, while the calyx is also frequently covered with thick, grey hairs.

This shrub, from the mountains of North China and the region of the Amour, is the first of all the Deutzias to flower. It reached Europe by way of St. Petersburg, whence it passed to the Arnold Arboretum of the United States, and was made known to western Europe by Prof. Sargent, who sent seeds to many other collections. The plant was first sent out as a garden shrub by Messrs. Lemoine of Nancy in 1891, their stock coming from a single branch received the previous winter, and hence without variation; a form has however been noticed amongst the seedlings grown at the Museum, Paris, which appears to be distinct and has been named the "Museum variety"—*D. parviflora varietas Musæi.* It differs in its more abundant leaves, which are flatter, longer, and more pointed ; its flower-clusters also bear fewer flowers which are set more closely together, and of a creamy-white colour. So far as we are aware, this form is not to be found elsewhere.



Deutzia Parviflora.

With the spread of *D. parviflora* in Europe, it figured among the new plants of several German nurseries, but on comparing these German plants with their own, Messrs. Lemoine found them perfectly distinct from their form of *D. parviflora*, and nearer *D. Lemoinei*—their cross between *gracilis* and *parviflora.* This view has since been confirmed by Dr. Dippel, director of the botanical garden at Darmstadt, who states that the plant known in Germany as *D. parviflora*, and raised from

American seed, in no way corresponds with the true *D. parviflora* of botanists. After describing this German seedling, he declares it to be (as M. Lemoine has suggested) a natural cross which he calls *D. angustifolia*, and this hybrid origin seems certain in view of the fact that *gracilis* and *parviflora* grew side by side in the Arnold Arboretum, and nothing would be simpler than this accidental crossing.

D. scabra.—To M. Lemoine we owe the reintroduction of this old but scarce shrub,—the true *D. scabra* of Thunberg,—a plant altogether distinct from the *D. scabra* of gardens, which is a mere form of *D. crenata* and hardly distinguishable from it. This beautiful shrub is from Japan, flowers fully three weeks in advance of its namesake, and is quite hardy but shows its buds so early that our late frosts sometimes catch it. The stems rise rather weakly to a height of 2 to 3 feet high, with a rough and bronzed surface, slightly hairy while young. The leaves have little or no stalk and are broadly oval in shape, finely toothed, waved and crisped like those of the Wayfaring Tree (Viburnum Lantana), strongly veined and roughly hairy in texture, deep green above and somewhat paler beneath. The stems spread somewhat loosely and are flowered from the very bottom, while all the side-shoots carry spike-like clusters of about 40 flowers, held very erect and widely open, half-an-inch or more across, and of snowy whiteness contrasting prettily with the golden stamens and an orange-red disk. The flowers begin to expand from the middle of May, and last long in beauty.

A plant sent out by another French firm as *D. Sieboldiana*, comes so near this plant that it may well be considered as a mere variety of it. While their hardiness and general appearance are the same, the *D. Sieboldiana* (of Chenault) differs in its longer leaves, which are less crisped and curled, as well as in the longer flower-clusters in which the petals are concave and irregularly undulating. This plant is said to force readily and well.

D. staminea.—A tender shrub from the moist mountain valleys of India, which can only be grown with success in the warmest gardens, and when thoroughly protected. Its stems and branches are hairy while young, becoming smooth with age; leaves lance-shaped, with unbroken edges, dark green above, and white and downy beneath. The flowers appear in June and July as a compact, terminal head of pure white, the petals triangularly pointed. Syn. *D. corymbosa* of Lindley.

D. Vilmorinæ.—A new kind of great merit from the mountains of Setchuen (China), raised from seed sent to M. Maurice de Vilmorin in 1897. Already over 4 feet, this plant bids fair to far exceed this height, throwing a number of stout woody shoots, clothed with soft, lance-shaped leaves of 3 inches, crisped and minutely toothed around the edges, the teeth just touched with white. The clusters of 20 to 35 large flowers are at first erect, but the slender stalks soon droop under the weight of the expanding flowers and hang horizontally, their number and graceful carriage making this one of the most charming of Deutzias. It is perfectly hardy, flowering from the early days of June, and distinct in effect from older kinds. The individual flowers are nearly an inch across, and snow-white, with their petals lightly crumpled.

As regards their general features, M. Lemoine would divide the Deutzias into four groups as follows:—Group I., containing only *D. crenata* with its many single and double forms. Group II., including smaller and less vigorous shrubs of slender growth, with flowers appearing early:—*D. gracilis*, *D. discolor* and its forms, and *D. Vilmorinæ*. Group III., consisting of early-flowering kinds with rounded and widely opened flowers, suggestive in general appearance of the Hawthorn, or certain Spireas:—*D. parviflora*, *D. scabra* (of Thunberg) and its form *D. Sieboldiana*, and *D. corymbosa*. Group. IV., comprising late-flowering kinds mostly from warmer climates, and too often tender in our gardens; they are further distinguished by their massive and much-branched heads of flower:—*D. staminea*, and *D. corymbiflora*. As already mentioned incidentally, *D. crenata* has so far resisted all attempts at crossing. Of the other kinds the best results have come from crossing the plants of Groups II. and III.; while more recently crosses have been secured between the plants of Group IV. on the one hand, and those of Groups II. and III.

EXOTIC FOREST TREES IN FRANCE.

In the course of his travels through France Monsieur Maurice de Vilmorin has had the happy thought to note the height of such trees as have any claim to forest value. As the climate of a great part of northern and western France differs little from our own, the results may be of interest to planters in this country.

Abies balsamea—Pouilly (Oise), nearly 40 ft.

A. cephalonica—Cheverny, about 50 ft.

A. cicilica—Cheverny, 65 ft.

A. concolor—Verrières, 25 ft.

A. grandis—Cheverny, 65 ft.

A. lasiocarpa—Cheverny, about 48 ft.

A. nobilis—Cheverny, about 55 ft.

A. Nordmanniana—Verrières, 65 ft.

A. numidica—Verrières, nearly 30 ft.

A. Pinsapo—Verrières, nearly 50 ft.

A. Veitchii—Segrez, 23 ft.

Acer dasycarpum—Malesherbes (Loiret), about 65 ft.

A. monspessulanum—Les Barres, 26 ft.

A. rubrum—Catros near Bordeaux, 65 ft.

A. macrophyllum—Pouilly near Meru (Oise), 33 ft.

Æsculus hippocastanum—Palaiseau, girth of 16 ft.

Æ. flava—Vaujours (Seine-et-Oise) about 58 ft.

Æ. rubicunda—Museum, Paris, 62 ft.

Ailanthus glandulosa—Fontainebleau, 80 ft.

Alnus cordifolia—Domaine des Barres, nearly 50 ft.

Araucaria imbricata—Pénendreff near Saint Renan (Finistère), nearly 50 ft.

Betula davurica—Domaine des Barres, 65 to 70 ft.

B. lenta—Domaine des Barres, 48 ft.

B. lutea—Parc de Baleine, 58 ft.

B. papyrifera—Domaine des Barres, about 48 ft.

B. populifolia—Ecole des Barres, about 65 ft.

Carya alba—Parc de Baleine, nearly 65 ft.

C. amara—Parc de Baleine, over 80 ft.

C. olivæformis—Parc de Baleine, about 98 ft.

C. myristicæformis—Parc de Baleine, 33 ft.

C. porcina—Parc de Baleine, 81 ft.

C. sulcata—Parc de Baleine, 65 to 70 ft.

C. tomentosa—Domaine des Barres, about 50 ft.

Castanopsis chrysophylla — Bourg - Argental (Loire), 26 ft.

Catalpa bignonioides—Verrières, 33 ft.

C. Kæmpferi—Segrez, about 30 ft.

Cedrela sinensis—Museum, Paris, about 40 ft.

Cedrus atlantica—Cheverny, 58 ft., girth about 8 ft.

C. libani—Vrigny near Pithiviers (Loiret), 70 ft.

Celtis occidentalis—Museum, Paris, 50 ft.

C. davidiana—Museum, Paris, 28 ft.

Cercidiphyllum japonicum—Segrez (Seine-et-Oise), 20 ft.

Cercis siliquastrum—Museum, Paris, 55 ft.

Chamæcyparis Lawsoniana—Pau, over 50 ft.

C. nootkatensis—Segrez, nearly 40 ft.

Cladrastis tinctoria—Fontainebleau, 48 ft.

Corylus colurna—Museum, Paris, 45 ft.

Cryptomeria japonica—Plessis-Picquet (Seine), 50 ft.

Cupressus lusitanica—Pau, about 48 ft.

C. macrocarpa—Antibes, 45 ft.

Fraxinus americana—Bois de Boulogne, Paris, over 50 ft.

F. dimorpha—Les Barres, 33 ft.

Ginkgo biloba—Fontainebleau, 65 to 70 ft.

Gleditschia sinensis—Verrières, 40 ft.

G. triacanthos—Parc de Sceaux, about 65 ft.

Gymnocladus canadensis—La Turpinerie (Charante), 85 ft.

Juglans nigra—Parc de Sceaux, 81 ft.

J. cinerea—Parc de Baleine, 58 ft.

J. hybrida—Verrières, about 75 ft.

Juniperus virginiana—Domaine des Barres 45 ft.

Libocedrus decurrens—Pau, 55 ft.

Liquidambar orientalis — Parc de Baleine (Allier), 49 ft.

L. styraciflua—Parc de Baleine, 81 ft.

Liriodendron tulipifera—Chateau de Frene, near Chaulnes, 124 ft., girth 16 ft.

Magnolia acuminata—Parc de Baleine (Allier), about 65 ft.

M. cordata—Domaine des Barres, about 50 ft.

M. grandiflora—Pau, 50 ft.

M. macrophylla, Chatenay, 33 ft.

Morus alba—Les Barres, about 38 ft.

M. alba fastigiata—Verrières, nearly 45 ft.

M. rubra—Segrez (Seine-et-Oise), 37 ft.

Nyssa aquatica—Parc de Baleine, about 70 ft.

N. sylvatica—Parc de Baleine, about 38 ft.

Ostrya virginica—Trianon, near Paris, nearly 45 ft.

Paulownia imperialis—Museum, Paris, 58 ft., girth 10 ft.

Phellodendron amurense—Museum, Paris, 33 ft., girth 4½ ft.

Picea alba—Domaine des Barres, about 35 ft.

P. Engelmanni—Parc de Baleine, about 30 ft.

P. nigra—Domaine des Barres, about 45 ft.

P. orientalis—Cheverny, 40 ft.

P. polita—Domaine des Barres, about 15 ft.

P. pungens—Ferté-Saint-Aubin, 23 ft.

P. rubra—Domaine des Barres, about 32 ft.

P. sitchensis—Cheverny, over 45 ft.

Pinus Bungeana—Segrez, about 23 ft.

P. contorta—Verrières, about 20 ft.

P. Coulteri—Verrières, 26 ft.

P. densiflora—Domaine des Barres, about 25 ft.

P. inops—Domaine des Barres, 45 ft.

P. insignis—Porzantrez-Morlaix, nearly 50 ft.

P. Jeffreyi—Verrières, nearly 40 ft.

P. Laricio—Museum, Paris, nearly 90 ft.

P. Laricio calabrica—Domaine des Barres, 72 ft.

P. Laricio Pallasiana—Parc de Baleine, 80 ft.

P. Laricio (Mt. Etna var.)—Barres, 58 ft.

P. mitis—Catros near Bordeaux, over 60 ft.

P. monophylla—Verrières, 20 ft.

P. palustris—Geneste near Bordeaux, 52 ft.

P. ponderosa—Verrières, about 48 ft.

P. pungens—Domaine des Barres, nearly 40 ft.

P. resinosa—Domaine des Barres, about 42 ft.

P. rigida—Parc de Baleine, 58 ft.

P. Sabiniana—Lattes, nearly 60 ft.

P. Salzmanni—Parc de Baleine, 80 ft.

P. sylvestris—Domaine des Barres, 70 ft.

P. Taeda—Parc de Baleine, 80 ft.

P. Thunbergii—Domaine des Barres, about 30 ft.

P. excelsa—Verrières, 48 ft.

P. Peuke—Domaine des Barres, about 30 ft.

P. Strobus—Parc de Baleine, 70 ft.

Platanus occidentalis—Harcourt (Eure), 52 ft.

P. orientalis—Malesherbes, 82 ft.

Populus alba—Segrez (Seine-et-Oise), 80 ft.

P. alba var. *bolleana*—Viry, 55 ft.

P. nigra fastigiata—Segrez, 70 ft.

P. deltoidea—Parc de Baleine, 80 ft., girth 13½ ft.

P. angulata—Orthez and Bayonne, about 70 ft.

P. tremuloides—École des Barres, 48 ft.

Prunus virginiana—Catros near Bordeaux, 65 ft.

Pseudolarix Kæmpferi—Verrières, about 22 ft.

Pseudotsuga Douglasii—Cheverny, 75 ft.

Pterocarya caucasica—Parc de Baleine, 81 ft.

Quercus Ægylops—Domaine des Barres, 50 ft.

Q. alba—Domaine des Barres, 48 ft.

Q. ambigua—Domaine des Barres, about 55 ft.

Q. ballota—Allard, la Maulevrie, about 30 ft.

Q. bicolor—Verrières, 48 ft.

Q. castanæfolia—Segrez, about 45 ft.

Q. Cerris—Domaine des Barres, about 75 ft.

Q. coccinea—Parc de Baleine, 97 ft.

Q. conferta—Allard, la Maulevrie, upwards of 35 ft.

Q. cuneata—Domaine des Barres, 50 to 60 ft.

Q. heterophylla—Parc de Baleine, over 90 ft.

Q. ilicifolia—Domaine des Barres, about 26 ft.

Q. imbricaria—Domaine des Barres, 58 ft.

Q. laurifolia—Pau, nearly 65 ft.

Q. lusitanica—Angers, about 30 ft.

Q. lyrata—Domaine des Barres, 26 ft.

Q. macrocarpa—Verrières, about 50 ft.

Q. marylandica—Domaine des Barres, nearly 55 ft.

Q. Mirbeckii—Pau, 50 ft.

Q. palustris—Parc de Baleine, 98 ft.

Q. Phellos—Pau, nearly 90 ft.

Q. rubra—Parc de Baleine, 80 ft.

Q. serrata—Cheverny (Loir-et-Cher), about 48 ft.

Q. stellata—Domaine des Barres, 45 ft.

Q. suber—Porzantrez-Morlaix, 48 ft.

Q. velutina—Domaine des Barres, 65 ft.

Rhus vernicifera—Segrez (Seine-et-Oise) 45 ft.

Robinia pseud-acacia—Museum, Paris, 45 ft.

R. viscosa—École des Barres, 33 ft.

Sassafras officinale—Catros near Bordeaux, 52 ft.

Sciadopitys verticillata—Segrez, 20 ft.

Sequoia gigantea—Parc de Baleine, about 70 ft.

S. sempervirens—Pau, about 70 ft.

Sophora japonica—Museum, Paris, 80 ft.

Taxodium distichum—Cheverny (Loir-et-Cher), 80 ft.

Thuya gigantea—Cheverny, 58 ft.

Tilia americana—Porzantrez-Morlaix, 80 ft.

T. petiolaris—Lacroix (Indre-et-Loire), about 40 ft.

Tsuga canadensis—Fontainebleau, nearly 65 ft.

T. Sieboldi—Verrières, 20 ft.

T. mertensiana—Verrières, 26 ft.

Zelkowa crenata—Pau, over 60 ft., girth 9 ft.

Zizyphus vulgaris—Museum, Paris, about 30 ft.

FLORA
AND SYLVA.

Vol. III. No. 29.] AUGUST, 1905 [Monthly.

EVIL-DOERS

It is well to consider the evil done to gardens by the presence of shrubs and trees having only the quality of quick growth. They are what gardeners often call "good doers," but they might more fitly be classed as "evil-doers," the result of their presence being that they often injure most things worth cherishing in the garden. Weedy evergreens for the most part, their final growth shows them in quite a different light from what they were when first planted, and their growth ends by shutting out air and beauty from the home landscape—often the worst thing that could happen under our dull skies. We were reminded of this unfortunate fact the other day in passing along a railway south of London, where one station with a wooden fence cutting the platform off from a yard near, was covered with yellow tea and other roses—a true picture of rose-time. At the next station, exactly similar as to position and soil, there was a Privet hedge against the wooden fence, the result a few miserable flowers at its foot. A better illustration could not be given of the effect on flowers of the use of one evil-doer, the rapid-growing Privet. After all the growth is not so very much more rapid than other things that are really worth having. Suppose one were to plant a holly hedge in good soil and use healthy seedling plants, the growth would be rapid and in the one case we have a hedge worth looking at, and in the other something worse than a weed; because the Privet is nauseating in odour when in flower, apart from its absence of character or beauty.

Cutting down to hard ugly lines is one result of the use of these fast-growing weedy evergreens, for where they push over paths as they commonly do in most country places, people have not the courage to cut them right out but trim them back to a hard line. Where they obscure the view into a beautiful woodland the result is the same—ugliness and wasted labour—while they cumber the ground which should be given to the beautiful flowering shrubs and trees which come to us in increasing numbers year by year, and in many places are ill-grown or absent when Privet, False-Laurels, and *ponticum* abound.

Although most of the shrubs we see in this way are quick-growing evergreens, variegated ones are often called in to help, and among them the variegated Privet. At the Horticultural Society's

Summer Show in July, the chief things shown by nurserymen in the open lawn were masses of common variegated shrubs. Large pots even were filled with variegated Privets. In Lincoln's Inn Fields lately, under the County Council's system of gardening (the most ridiculous in Europe) a line of common variegated Privet has been planted all round the square, the most inartistic fringe that could be thought of. Squares like that of St James's and Lincoln's Inn bear witness to the way these weedy shrubs run amok in the finest positions in London, and also to the callous ignorance of those responsible for their care, and many country seats show a like result. In designing new places and even in public gardens, we see this evil system of planting quantities of coarse evergreen shrubs because they are cheap and rapid growers. In this way the cost of the formation of these gardens is in a great measure wasted, so far as regards any artistic point of view, or even from that of the simple aim of teaching the variety of beautiful shrub-life.

I went to the Zoological Garden in the Regent's Park the other evening—a warm and close one—the place had been ignorantly planted with Privet in many parts and the odour was nauseating, and this has a bad effect on people who do not know its source.

Sometimes the stock of evil-doers is increased by the grafted shrubs systematically sent out, as in the case of the pontic Rhododendron, which in time kills most of the kinds grafted on it, and takes their place. Beside a lake I am now grubbing up a number of rank Osiers which obscure the view. They came there as the stocks of Willows which have since perished disliking the "union" and these weeds are now unfortunately making a vigorous growth. The use of the Osier for grafting ornamental Willows leads to much ugliness of this kind. Evil-doers are just as rampant among herbaceous plants and novelties, half the kinds mentioned in catalogues with extravagant descriptions, being useless for effect. The scope of a botanic garden is different, although even there the repetition of worthless species is a mistake. One good plant known to us, well grown and well placed, is generally worth many novelties. In no case has the grower more need to be cautious, than when making selections from catalogues of perennial plants.

* * *

THE CHINESE TULIP-TREE
(*Liriodendron chinense*).

For many years the facts concerning this tree were so little known that botanists have been in no hurry to name it, but with our present knowledge there is no question of its distinct character. Both the American and the Chinese trees are equally variable in the shape of their leaves. In size, possibly, those of the latter are the larger, and they are often somewhat glaucous, but it would be unwise to attach importance to this fact. It is only in the flowers and fruit that any real distinction exists. In the Chinese tree the flowers are only about half the size of those of the American species, so finely shown (but also reduced about one-half) in the engraving. In the flowers of the oriental tree the petals are narrower and more widely divergent; the carpellary column is more elongated, more cylindrical, and disintegrates at a later period; the carpels also are quite different, being rounded and straight at the apex instead of acuminate and reflexed as in the American species.

Flowers of the Common Tulip-Tree (*Liriodendron tulipifera*).

The Chinese Tulip-tree is common in the woods and copses of central and western China at elevations of 4,000 to 8,000 feet. Shearer and Maries met with it in the Lushan Mountains in Kiangsi province; Henry and myself in western Hupeh; Farges in north-east Szechuan. In 1903 and 1904 I met with it very frequently in the forests of western and north-western Szechuan. It extends therefore across 15° of longitude. It is usually a small tree 15 to 25 feet high, but that from which I gathered mature fruit and seeds was fully 60 feet in height, with a large trunk and widely spreading branches. Trees of 15 feet or so in height bloom quite freely, bearing flowers of a greenish-yellow like those of the American species. The Chinese name for the tree is *Wo-chang ch'ui* (Goose-foot) from a fanciful resemblance of the more attenuated leaves to the foot of a goose.

Young trees of this kind have been

raised in Messrs. Veitch's Coombe Wood nursery from seeds collected by me in 1900, and from there have been sent to the principal botanic gardens in this country, to Glasnevin, and to the Arnold Arboretum of the United States. At Coombe Wood and at Kew the plants have so far proved quite hardy, and indeed from the elevation at which the trees are found in China there is no reason why it should not prove fully as hardy as the American species.

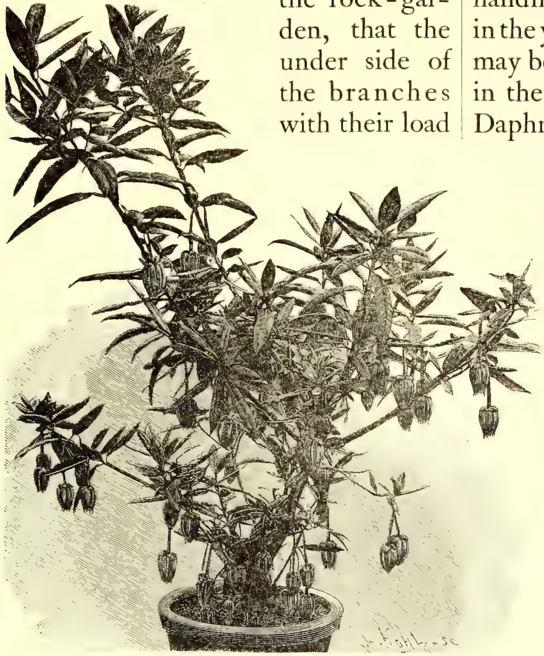
E. H. WILSON.

References.—Liriodendron sp. nov. Le Marchant Moore, Jour. Bot., vol. xiii., p. 225 (1875); L. tulipifera, Linn. var. (?) chinense, Hemsl. Index Floræ Sinense, p. 25; L. tulipifera var. sinensis, Diels. Engler Bot. Jahrb., vol. xxix., p. 332 (Flora von Central China, 1901); Chinese Tulip-tree, Hemsl. in Gard. Chron. Nov. 28, 1903, p. 370; Liriodendron chinense, Sarg. Trees and Shrubs, tab. 52; Liriodendron chinense, Sarg. Hook. Ic. Pl. tab. 2785.

TRICUSPIDARIA.

Whether it be mere coincidence, or the outcome of some law acting in ways still unknown to us, certain it is that the coast region of western South America is remarkable for the brilliance of its flowers, among which are the Lapageria, the Mutisias, Mitraria, many brilliant Fuchsias, the Embothrium, Berberidopsis, Desfontainea, Philesia, and amongst trailing herbs the Flame-Nasturtium (*Tropæolum speciosum*). But even in such a galaxy the *Tricuspidaria dependens*—still better known as Crinodendron—is able to hold its own for fine colour. It grows in the low moist valleys of Chili and Peru, reaching the size of a tall shrub or low tree of 15 to 20 feet, with a trunk sometimes as much as 8 inches in diameter. The brilliant drooping flowers cover the plants from November—the beginning of the southern summer—and last for several months, springing singly or in pairs from the axils of the leaves, especially upon the upper branches. They are peculiar in shape, hanging like large waxen bells upon very long slender stems, the upper part broad and inflated while the mouth is at first closed by the incurving petals and only half-open when mature. Their colour is mostly clear coral-pink, with sometimes a trace of orange-scarlet, but this form of the plant is rare. Variation in leaf and habit is more common in the wild plants, but in the best-known form the leaves are very like those of a Bog Myrtle (*Myrica*), dark green, wrinkled, somewhat fleshy, and sharply toothed in the upper half. A peculiarity of the plant is the slow development of its flower-buds which are fully formed in the early autumn many months before they expand; in severe winters they are sometimes destroyed with the loss of a season's beauty, even though the plant may not suffer in other ways.

This beautiful shrub was several times introduced to English gardens, coddled in hothouses, and lost. Tried again by Messrs. Veitch some 25 years ago it is now thriving in many parts of Britain as a hardy shrub, and quite happy in an unheated house in the colder parts of the country. A cool moist atmosphere such as prevails around the coast of Ireland and the west of Britain is the secret of success with this, as with other Chilian plants. In many parts of Ireland and the western coasts of Scotland it does especially well in the open air and is rarely injured by cold. The flowers open in April and May and so freely that on a little plant of only 4 feet, grown in an open garden of the north of Ireland, 100 flowers have been counted at once. As a shrub it is of rather irregular growth, and left to itself the drooping flowers are largely hidden by the leaves. To secure the best effect, wherever the climate is warm enough it should be planted on a high part of the rock-garden, that the under side of the branches with their load of flowers may be fully seen. In colder places it may be grown against a shady wall and the shoots so trained as to display their beauty. When under glass a house free from frost is all that it needs, and, unless the outer air is too dry, a few months in the open air during summer will do no harm. At Kew it is grown on the shady side of the temperate house, where little or no direct sun can ever reach it, and good results are got in other places in quite a shady aspect. Its culture in no way differs from that of other hard-wooded plants, thriving either in pots as in our engraving, or planted out in well-drained peat and loam and increased from cuttings or layers. Cuttings may either be rooted in heat early in spring, or in peat and sand under a handlight and in a shady border later in the year. Layers of the lower branches may be made under flat pieces of stone, in the same way as with certain of the Daphnes. The plant has not yet reached anything like full size with us, but fine shrubs of 8 to 10 feet are to be found in various parts of the country.



Tricuspidaria as a Pot-plant.

The plant has been unfortunate as to names. First called *Crinodendron Hookerianum*, this name was changed for that of *Tricuspidaria*, which, however fully justified by the three tips into which the petals are divided, cannot be considered a happy choice. It was well figured in colours in *The Garden* of November 27, 1880.

Another species of Tricuspidaria with white flowers has recently bloomed in the temperate-house at Kew, bearing the legend *species* (?). It would appear to be of somewhat freer growth than *dependens*, having run up into a lightly branched shrub of about four feet, with leaves shorter and more rounded than in the old kind and bell-like flowers springing from the leaf-axils on the under side of the branches. Though similar in shape and structure, these are smaller, more open at the mouth, and less fleshy in texture. B.

GERBERA, WITH A COLOURED PLATE OF THE NEW HYBRIDS.*

Gerbera is the name for a small group of composite plants from the temperate and mountain regions of Asia, Africa, and South America, containing only about a score of kinds and those mostly without ornamental value. The best-known is *G. Jamesoni*, also known as the Transvaal or Barberton Daisy, found by Rehman about 1878 and subsequently by a Mr. Jameson near Barberton, and elsewhere by other travellers in the Transvaal and Natal. Brought to this country in 1887 it flowered with Mr. Tillett of Norwich and later at Kew, where the glowing scarlet of its flowers attracted instant attention. The wild plants vary in colour from rich red to coral-pink and yellow, as in the form named *Sir Michael*, sent from Natal by Mr. W. R. Adlam.

The plant is a stemless evergreen perennial throwing a rosette of leaves from a thick woody rootstock, which lives to a great age, increasing slowly by side-shoots and striking deep with its fleshy tap-roots. The plant is averse to removal and should therefore be well planted at first in a sunny and sheltered spot and light warm soil. Where the soil is poor it may be improved by adding a little leaf-mould, but nothing is better than a good free loam, though some growers have secured good results from plants grown almost entirely in sand, and watered from time to time with liquid manure when in full growth.

The leaves are 10 to 12 inches long and shaped like those of a Dandelion or Francoa, being deeply lobed, more or less hairy above and beneath, and rich dark green when in full luxuriance. The plants bloom through a long season, beginning early and continuing into October, the solitary flame-coloured flowers measuring 3 to 5 inches across, and, though not very numerous at any one time, they last fresh for a long while and succeed one another without interruption. They stand high above the leaves on long bare stems which vary in length, with the age and vigour of the plant, from 1 to 3 feet. The ray-florets or *ligules* are very long, narrow, and pointed, closing partially during bad weather in newly opened flowers, and though after a few days they become less sensitive, their full beauty is only seen in bright sunlight. The rarity of the plant after nearly twenty years of cultivation is due to difficulty in keeping it in health when its needs are not fully understood, and also to its increase so far not having been rapid. Seeds and offsets are the only means of propagation, for though root-division is possible it is a mistake to disturb well-established plants. Seeds are easily obtained if pollen is brought from another plant, though single plants are commonly sterile. Sown in gentle heat early in the year the seeds soon germinate and the little plants may be planted out or potted on by the end of May and often show flower in the second season, though they are not at their best until the third year. Young offsets detached with a heel will strike easily in bottom heat, but this is slow work, for side-shoots are few and the young plants made in this way are less satisfactory.

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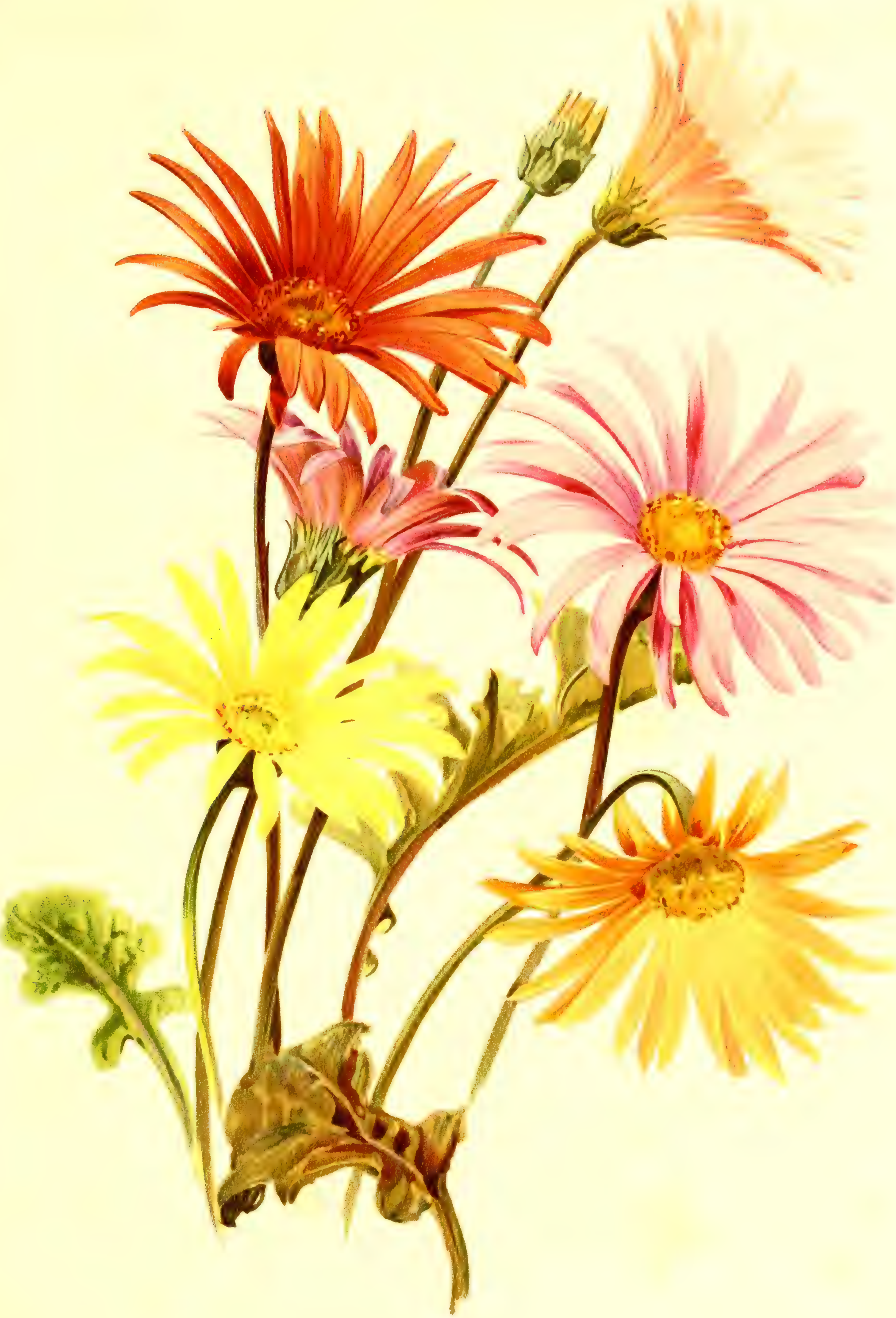
* From a drawing by H. G. Moon in the Cambridge Botanic Gardens.



The hardiness of the Gerbera has been a debated point, but in most parts of Britain if in the open air it must be planted in a warm place such as the foot of a wall and preferably one with hot-water pipes on the other side, as at Kew, where the plants thrive against the sunny side of the Orchid-house. In such sunny and sheltered places of the southern counties it has passed a good many winters in the open air. At Cambridge it thrives at the foot of a wall, protected during winter by glass lights from rain and cold dews, while allowing full ventilation on every side. A friend writing from a spot so far north as Alnwick says that he has had *Gerbera Jamesoni* in the open for about six years with scarcely any protection, showing that in favoured places where its needs are understood, the plant is far hardier than at first supposed. A dry well-drained spot and sunlight are essential to success, and given these a certain degree of frost does the plant no harm. In places that from conditions of soil and climate are unsuited to the Gerbera, it may be grown in pots in a sunny airy house and treated like the Gazanias and other South African plants, but though it blooms fairly well in pots its progress is slow. It will not stand over-potting or over-watering, and after a long experience with the plant, under all manner of conditions, I find it thrive best in good loam of a fairly substantial nature.

Hybrids. The hybrid Gerberas which I have raised are likely to be valuable. In colour they vary from white to pink, and a scarlet even more brilliant than that of *G. Jamesoni;* they offer many shades of yellow, and already promise good sunset tints in orange and orange-pink. As cut flowers they last a long time in water and are often quite fresh even after a fortnight. The first hybrid was made between *G. viridifolia* which has small dirty-white flowers, and *G. Jamesoni*, the result being various shades of colour from white to deep pink. Another of the first crosses was between *G. Sir Michael* and *G. Jamesoni* producing Gerbera "*Brilliant*." The colour of this cross is more vivid than that of *Jamesoni*, the yellow of *Sir Michael* having softened and heightened the dark intensity of the Barberton Daisy. Crosses were made again between *Sir Michael* and the first hybrid, and all the early crosses have been crossed again with one another with a view to obtaining sunset colours, so that the plants exhibited this year at the Temple Show have resulted chiefly from four crosses. The hybrids so tend to vary that by cultivation and selection yet more important results may be expected at the hands of Messrs. Veitch, to whom these plants have been entrusted for distribution. Some of the hybrids are freer in flower than *G. Jamesoni* but without the same length of season, though this point will no doubt receive attention in future selection. Some of the hybrids have larger flowers than either of the parents, while others vary in sizes which meet the prevailing demand for small composite flowers. A first-class certificate was awarded in 1891 to a group of *G. Jamesoni* from the Cambridge Botanic

Garden, and *G. viridifolia* and *G. Sir Michael* were both introduced through the same institution. *G. viridifolia* is now lost, but is in itself of no value though in crossing it sufficed to give the white and pink colours and its own free habit. *G. Sir Michael* is a distinct variety of *Jamesoni* differing chiefly in its pure yellow colour, but it is a much more difficult plant to cultivate; its descendants of the same colour, obtained by crossing, are quite easy to grow. Amongst the named hybrids are *Brilliant*, already described; *Evangeline*, with rosy flowers paling to soft yellow in the centre; *King Arthur*, rosy-salmon colour; *Hiawatha*, clear light scarlet; *May Queen*, soft rose; and *Village Blacksmith*, lemon-yellow.

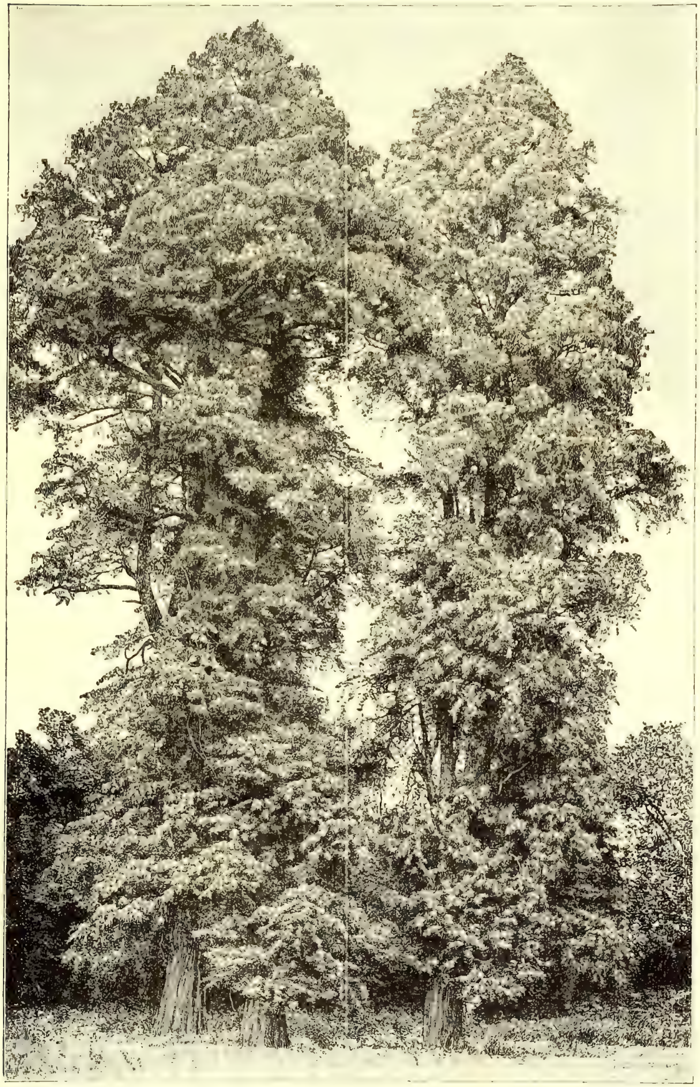
It is a mistake to suppose that seeds are not easily produced, but it is essential that pollen should come from another plant, for single plants of Gerbera are sterile. This is frequently the case among the *Compositæ*, indeed self-sterility throughout the vegetable kingdom is far more common than is supposed, and the failure to obtain seed from plants is often due to the need of pollen from another individual. In crossing Gerbera take the pollen from the anthers by squeezing gently between the thumbnails, and convey it to the stigmas in flowers that have just opened.

In addition to the varieties of *G. Jamesoni* already mentioned as having served in my experiments, two or three named forms are offered by continental growers such as the *atrosanguinea* of Sprenger, with blood-red flowers; *illustris*, also an Italian plant, described as of stronger growth with larger flowers of a more brilliant shade; and *transvaalensis*, a variety grown in Belgium.

The name Gerbera is in honour of a German naturalist named Gerber. The other species are almost unknown to gardeners and are for the most part low-growing plants of purely botanic interest, such as *G. Anandria* from Japan and eastern Asia, *G. lanuginosa* and *G. Kunzeana* from the Himalayas, and *G. chilensis* from South America. For though so few in number the members of the group are widely scattered from Japan through Asia and Abyssinia to South Africa and Madagascar; on the far side of the Atlantic they appear, in the West Indies and various parts of South America to its extreme south. Among introduced kinds are *G. viridifolia* an interesting plant from South Africa, smaller than *G. Jamesoni* with flowers only 2 inches across, dull white inside with pale yellow reverse flushed with lilac towards the tips of the rays. The bright-green leaves rise from a woolly rootstock and are lance-shaped and not lobed. In addition to their lack of colour the flowers are only open for a few hours each day, so that little has been heard of the plant in gardens. More beautiful is *G. asplenifolia*, also from South Africa, with purple flowers upon long woolly stalks and short fern-like leaves of glossy texture. Another pretty plant bearing bright purple flowers with a yellow disk and deep green fleshy leaves is sometimes known as *G. crenata*, but is more properly called *Mairia crenata*.

R. IRWIN LYNCH.

The Botanic Garden, Cambridge.



The Bald Cypress at Whitton (*Engraved for "Flora" from a photograph*).

TREES OF THE BALD CYPRESS AT WHITTON.

These are among the most beautiful in the Thames valley, tall, fine in form, old, and of proved hardiness and vigour. As the frosts strike hard on the valley, there can be no doubt as to their hardiness. The soil too, not far from water, suits them very well, so that here we have a fine proof of the quality of this tree for many parts of our country. Having already fully dealt with it from every point of interest, we need now only refer our readers to page 163 of our second volume.

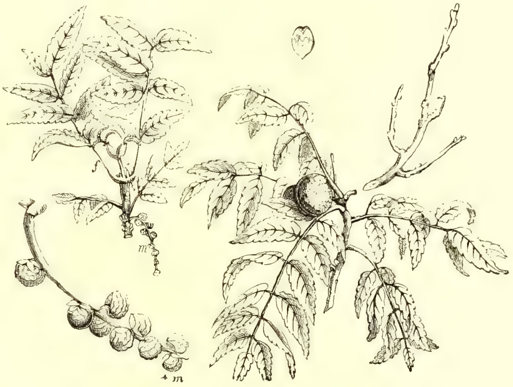
THE GREATER TREES OF THE NORTHERN FOREST.—No. 29. THE BLACK WALNUT (*Juglans nigra*).

From its size, rapidity of growth, beauty, and the excellence of its wood and its fruits, there is perhaps no more valuable tree in the forests of North America. In rich woods where the soil is moist it reaches a height of 150 feet, with a girth of 20 feet at 4 feet from the ground. True, such immense trunks are rare and, being much in demand for their timber, it is now only in distant and unsettled parts of the country that such giants can be found. The leaves are 12 to 18 inches long, of a pleasant green, and fragrant when bruised, as are also the green fruits which appear at the ends of the young shoots. These nuts are round and covered with a thick husk which, though at first green, turns slowly to a deep brown and furnishes an almost indelible dye. The kernels are in demand for dessert and for confectionery of many kinds, while the unripe nuts are made, while small and tender, into a catsup much used for flavouring.

In the Landscape. For landscape planting the Black Walnut is one of the most beautiful of trees. At its best it forms a grand head and becomes only more picturesque in extreme age, while owing to its light foliage and open crown grass thrives right up to its base. It is therefore well adapted for planting in parks. It has been said that from some injurious influence of its roots and leaves other plants will not thrive in its shade, but I have found little to justify this assertion: indeed in this neighbourhood I often see it towering above a mass of undergrowth, and have just condemned a fine young Tulip-tree 20 feet in height, which has sprung up under the shelter of a Black Walnut in my grounds. The stem of the Tulip-tree is only 18 inches from that of the Walnut, yet it is quite healthy, as are also some Clethra bushes near at hand which blossom freely every year. In another place a young Black Walnut of about fifteen years old has sprung up among a dense growth of shrubs, and as it makes a good centre to the group it has been allowed to remain. I have also time and again seen the tree planted on a grassy lawn, with the ground beneath it fresh and verdant. There is however an objection to its use for avenues or around buildings, the large and heavy fruits being liable to fall suddenly after frost in a way that is inconvenient for passers-by. In the autumn when the nuts are ready to fall, American children have no keener delight than to go to the woods and collect a supply for the winter. When brought home they are piled on the ground while the hulls ripen, and "hulling" thereafter dyes the hands of our school-children a rusty brown for weeks at a time.

Trees of great value are apt to be looked at merely from the commercial standpoint, and only in this way can I account for the neglect of the Black Walnut among planters. For fine effect it is far before the Ailanthus—formerly imported in such numbers and valued among us because an exotic. The smell of the Ailanthus flower is as disagreeable as that of the Walnut leaf is pleasant, and the roots of our tree do not sucker like those of the Ailanthus. Plantations of young trees are sometimes made in this country for the sake of the wood and the nuts, but in the main farmers are unwilling to wait twenty years for their reward and trees do not fruit well until of this age, while for timber a still longer time is necessary. The young trees are not easy to transplant and are mostly raised from seeds sown where they are to remain. When planted for ornament, one of the most important uses of the Black Walnut is to give variety to parks and shady places. The forests of Europe are largely composed of a few species, whereas in the temperate regions of North America the number of distinct forest trees is large. Our many kinds of Oak, Chestnut, and Hickory; our Tulip-trees and our Magnolias, our Locusts, Gum-trees and Poplars, Beeches and Birches, Ashes and Maples, with a host of smaller trees and shrubs, to say nothing of many noble evergreens, give a character of fine diversity to the American forest. And among them all the Black Walnut stands forth worthily, with its immense leaves, its spreading head, its clear light verdure and its stately form.

Wood. The wood of the Black Walnut is very hard and rich dark brown in colour. Twenty-five years ago Walnut furniture was in great esteem; now it is voted dull and dark, while the popular fancy has turned to Mahogany, Bird's-eye Maple, and Oak. It is still much used however for interior finishing, hardwood floors, and for all kinds of work entailing exposure to weather. For rough outdoor wear it is as good as Oak, and without its tendency to warp and crack. In my own house the woodwork of one floor, including doors and window-frames, is Black Walnut, as are also the stairs. The wood gains a richer tone with age, but if fully seasoned and oiled its colour is from the first almost equal to that of old Oak after centuries of wear. This gives it a special value in restoring old interiors, working well and easy to carve. The roots are used as gunstocks and as veneer, and the heavier branches as naves for wheels. There is, in fact, no drawback to its use, unless it be its low value as a fuel, and in timber so much used in dwellings this is perhaps rather an added merit.



Leaf and Fruit of the Black Walnut.

The price of mature wood of the best quality forbids its use except by the wealthy.

Range. The Black Walnut has a wide range, being common as far north as Ontario, west to Kansas, and throughout the southern States. In the rich bottom lands of Tennessee and Arkansas it attains its noblest proportions, and in these States it was once not unusual to find groves of the Black Walnut from 100 to 150 feet high, with trunks of 3 to 7 feet in diameter.

Increase. When planted for timber it is usual to sow the seed where the young trees are to remain, and about 5 feet apart each way. If grown for nuts the distance should be increased to 15 or 20 feet, thinning subsequently to about 30 feet apart. Such close planting as is advised in the bulletins of the States Departments is intended to secure tall, slender trees, carrying their branches high. Left to itself the habit of the Black Walnut is to branch so low down as to spoil its bole for timber. The nuts are mostly planted late in the fall but may be carried over until early spring if kept moist in a damp place. They often keep well in a box on the north side of a building, covered with soil to hold the moisture. The seedlings carry a long tap-root, and if raised for transplanting these should be cut about 8 inches below the surface when the plant is a year old; in this way fibrous roots may be induced which permit of transplanting without serious loss.

DANSKE DANDRIDGE.
Shepherdstown, W. Virginia.

The following technical description of the Black Walnut is from Sargent's "Manual of the Trees of North America," p. 128.

"Leaves 1°-2° long, with pubescent petioles, and 15-23 ovate-lanceolate leaflets 3′-3½′ long, 1′-1¼′ wide, often unequal at the base, long-pointed, sharply serrate except at the more or less rounded unequal base, thin, bright yellow-green, lustrous and glabrous above, soft-pubescent below, especially along the slender midribs and primary veins, turning bright clear yellow in the autumn before falling. Flowers: staminate in stout puberulous aments 3′-5′ long, rotund, 6-lobed, with nearly orbicular lobes concave and pubescent on the outer surface, their bracts ¼′ long, nearly triangular, coated with rusty brown or pale tomentum; stamens 20-30, arranged in many series, with nearly sessile purple and truncate connectives; pistillate in 2-5-flowered spikes, ovate, gradually narrowed at the apex, ¼′ long, their bracts and bractlets coated below with pale glandular hairs and green and puberulous above, sometimes irregularly cut into a laciniate border, or reduced to an obscure ring just below the apex of the ovary; calyx-lobes ovate, acute, light green, puberulous on the outer, glabrous or pilose on the inner surface; stigmas yellow-green, tinged on the margins with red, ½′-¾′ long. Fruit solitary or in pairs, globose, oblong or slightly pyriform, light yellow-green, roughened by clusters of short pale articulate hairs, 1½′-2′ in diameter; nut oval or oblong, slightly flattened, 1⅛′-1½′ in diameter, dark brown tinged with red, deeply divided on the outer surface into thin or thick often interrupted irregular ridges, 4-celled at the base and slightly 2-celled at the apex; seed sweet, soon becoming rancid.

"A tree, frequently 100° and occasionally 150° high, with a straight trunk often clear of branches for 50°-60° and 4°-6° in diameter, thick limbs spreading gradually and forming a comparatively narrow shapely round-topped head of mostly upright rigid branches, and stout branchlets covered at first with pale or rusty matted hairs, dull orange-brown and pilose or puberulous during their first winter, marked with raised conspicuous orange-coloured lenticels and elevated pale leaf-scars, gradually growing darker and ultimately light brown. Winter-buds: terminal ovate, slightly flattened, obliquely rounded at the apex, coated with pale silky tomentum, ⅓′ long, with usually 4 obscurely pinnate scales; axillary ⅛′ long, tomentose, their outer scales opening at the apex during the winter. Bark of young stems and branches light brown and covered with thin scales, becoming on old trees 2′-3′ thick, dark brown slightly tinged with red, and deeply divided into broad rounded ridges broken on the surface into thick appressed scales. Wood heavy, hard, strong, rather coarse-grained, very durable, rich dark brown, with thin lighter coloured sapwood of 10-20 layers of annual growth; largely used in cabinetmaking, the interior finish of houses, gun-stocks, and shipbuilding.

"Distribution. Rich bottom-lands and fertile hillsides, western Massachusetts to southern Ontario, southern Michigan and Minnesota, central and northern Nebraska, eastern Kansas, and southward to western Florida, central Alabama and Mississippi, and the valley of the San Antonio River, Texas; most abundant in the region west of the Alleghany Mountains, and of its largest size on the western slopes of the high mountains of North Carolina and Tennessee, and on the fertile river bottom-lands of southern Illinois and Indiana, south-western Arkansas, and the Indian Territory; largely destroyed for its valuable timber, and now rare."

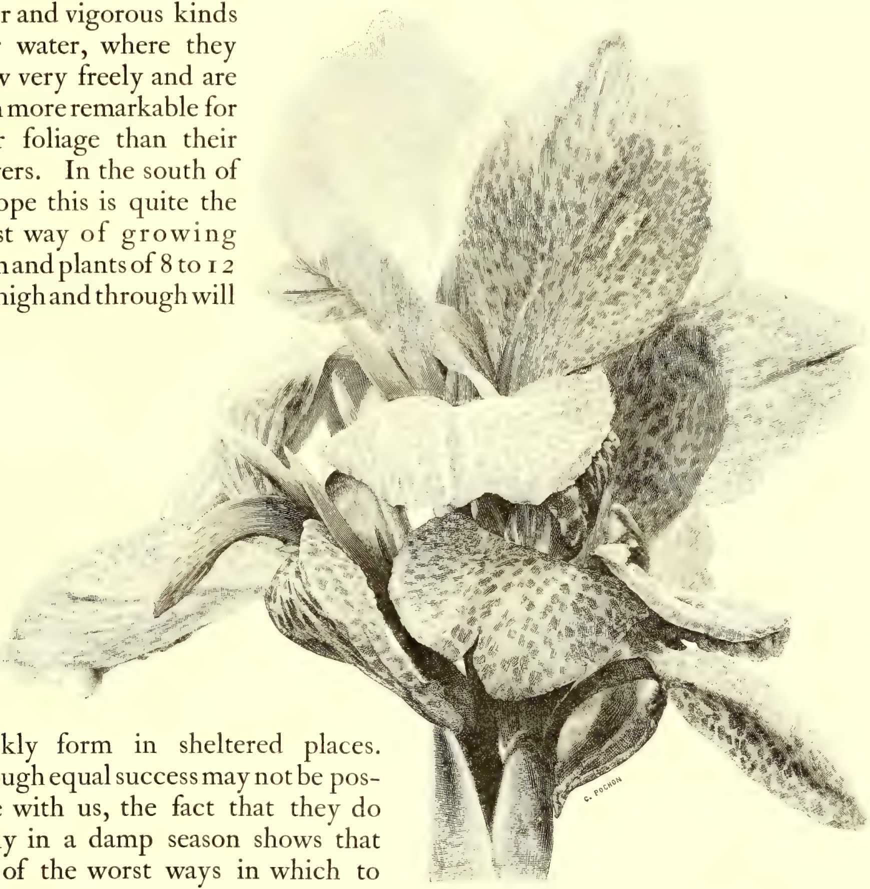
CANNAS PAST AND PRESENT.

At this moment there is probably no spot more brilliant in Europe than Hyères-les-Palmiers, that quaint little town of southern France. I once chanced to visit Hyères in midsummer, when its Cannas and Oleanders are in their glory, and the feast of colour took one's breath away. Oleanders everywhere, pink and crimson and white, yellow and copper-coloured, toppling over with their own extravagance. Unruly ones tumbling over walls; dignified ones standing attention in the public squares; homely ones sedate and proper in the villa gardens. Oleanders of which I had never dreamed, in every garden, beside every stream, even to the wild *vallons* of the hillside. And where there were no Oleanders there were Cannas, in ranks and battalions, Cannas dark and Cannas green, Cannas crimson and scarlet, orange and yellow; Cannas of Crozy and Cannas of Deleuil and a dozen lesser growers; Cannas by the tens of thousand everywhere. As a town decked for some great festal Hyères was decked with these colours, reinforced now by a gorgeous Poinciana, a Jacaranda in all its glory, or a house-front swathed to the tiles with the orange clusters of *Pyrostegia ignea*. Never shall I forget that day; and yet before it passed one wearied of the glory and came to loath the scarlet and the crimson, the orange and the yellow. For in the south the Canna is at its best and its worst. The depth of colour, the profusion, the luxuriance, is unequalled with us, but there is an utter lack of that restful turf, the subdued lights and softened greens, which alone make such a glow acceptable. For some inscrutable reason one sees the Canna only in that intolerable *massif* to which our neighbours are so prone, and a bed of two thousand Cannas undiluted is—at least to northern ideas—somewhat overpowering. There are times when such magnificence is not oppressive, and places such as the famous "*Tete d'or*" where, tempered by the surroundings, one can revel in the rich display; but to be shut up in a little square or public garden with its spread of Cannas in full beauty, garnished with Alternantheras equally assertive, moves one to get away a score of miles, hoping in one's haste never to see another Canna. But this is not the fault of the Canna—it is merely its abuse.

Early Cannas.

The Canna is hundreds of years old in the gardens of Europe, the first forms having come to Spain and Portugal in the days of the adventurers, who used the hard round seeds as praying-beads. They reached us early, for Gerard (in the last days of the sixteenth century) tells of his Cannas, and Parkinson of the "brave flowers," which he tended with care. Miller's plant dictionary of 1733 describes some half a dozen kinds under the early name of Cannacorus or Indian Reed, and some sixty years later Aiton again refers to these kinds as under cultivation, but whether outdoors or under glass is now uncertain. That other kinds gradually found their way into our gardens is shown by the record of the *Botanical Magazine* where a good many species are figured between 1799 and 1855, but Britain has always followed rather than led with the Canna, a thing perhaps not surprising in view of the fact that it is primarily a southern flower and happiest under sunny skies. Certainly these early plants were freely used upon the continent when little known with us, for more than fifty years ago we find a writer urging the importance of the Canna for summer-gardening in Britain, upon the ground of its long-proved value in Germany and other parts. These early kinds were mostly raised in the south of France by a M. Annee of whose experiments no complete record remains, though some of his seedlings such as *C. Annei* and its forms, and *C. rotundifolia*, showed real advance and were much used in subtropical gardening. They were however straggling and ungainly, with bare stems and clusters of small flowers, soon over and with little colour variety. Following these came the first large-flowered forms raised from *C. Warscewiczi*, a dwarf species from Costa Rica, crossed with *C. iridiflora*, a tall kind with drooping crimson flowers from Peru. These crosses, followed by other seedlings and selections of Sisley and others, were really handsome plants but with too short a season and with few flowers; the best of them, *C. Ehermanni* and *C. Noutoni*, are still found in some old gardens. By this time the example of Sisley had fired other nurserymen of Lyons, and it was about twenty years ago that Crozy sent out the first of his Gladiolus-flowered Cannas now known the world over. The parentage of these has never been authoritatively declared but they are believed to come from *C. indica*, with handsome red and yellow flowers, crossed with *aureo-picta* and the improved forms of *iridiflora*. Crozy's early kinds are now mostly discarded, but they laid the foundation of the dwarf large-flowered race of to-day and a few such as *Mdm. Crozy* and *Souvenir d'Antoine Crozy* are still grown for their excellence. One of the first Cannas seen in the London parks was *Premices de Nice*, used in 1877, while in the following year the plant had so gained in favour that seven varieties received awards from the Royal Horticultural Society. Since that time the Canna has steadily gained ground, and raisers in France, England, Germany, and America, have sent out a multitude of kinds more distinct in name than effect. Yet there has been steady progress in general excellence, size of flower, freedom, habit, and range of colour, though there is also some loss of vigour seen in the fact that the best kinds are often of faulty constitution.

Uses. With us the Canna is less seen outdoors than under glass, though in warm and sheltered gardens of the south and especially along the coast, it is capable of fine effect in the open air, though seldom used in the best ways. The beauty of the plant is spoiled when thrust into beds where the stiff outline of the shoots—leaves rigidly erect and stems bolt upright—is yet more emphasised by formal surroundings. The massed effect also of such vivid colour is garish and lacking in repose. Dispersed in chosen corners, using a few strong plants of one colour varied by groups of other things, their effect is more graceful and their colour useful. Clear self-colours should be used, the spotted and flaked kinds being best under glass, where their mottling is better seen and they can have the care due to their greater delicacy. The best effect of all is gained by planting the taller and vigorous kinds near water, where they grow very freely and are even more remarkable for their foliage than their flowers. In the south of Europe this is quite the finest way of growing them and plants of 8 to 12 feet high and through will quickly form in sheltered places. Though equal success may not be possible with us, the fact that they do finely in a damp season shows that one of the worst ways in which to grow them is on the raised round beds where they are mostly seen. The old *Canna Ehermanni* is still planted in this natural way in some gardens of the south-west, and being a great grower, nearly hardy, and of fine colour, it is still one of the best for the purpose. Its outline is better than that of many Cannas, leaves and flowers bending gracefully beneath their own weight. Few plants are finer than the Canna in leaf-effect, and strong plants grown in tubs are useful for summer gardening and under glass at other seasons, while small pot plants serve for room and table decoration. The cut blooms drop too soon to have much value, while if cut with much stem the plant is spoiled and the secondary flowers springing from the base of the first



Mrs. F. Dreer—A Good Spotted Canna.
(*Engraved for "Flora."*)

spike, are sacrificed. It helps the plants to remove the blossoms as they fade, and so prevent their strength running to seed. It often happens in a fine autumn that many buds remain at lifting time, and to preserve these the plants may be lifted and laid in thickly under glass with a little heat. They will then often go on blooming for quite a while, giving colour at a dull time, while the one care needed is to avoid over-watering.

Culture. Few plants are more easily grown than the Canna, and with care it may be had in beauty at almost any season, its culture varying with the season at which it is desired to flower. For the open air the rhizomes should be potted as they start into growth, grown fairly cool, and hardened off for planting when fear of frost is gone. Good light soil should be deeply dug and dressed as for Dahlias, and beyond a mulch of leaf-mould or light litter and watering in dry seasons, little else is necessary. Put out 3 feet apart, the plants begin to bloom from midsummer and continue until frost. Seeing that such plants are often at their best in autumn, some prefer to grow them in sunk pots which can be lifted without check when frost threatens and secures a continuous bloom under glass into the dark days. Others, who make a point of winter-flowering Cannas, prefer to strike healthy suckers in August and grow them on in small pots and with a single stem, to flower in a warm house during winter, when their brightness is welcome and the flowers last longer than in summer. Some kinds lend themselves to this treatment better than others, and a list of these will be found under *Kinds*. For blooming in spring, stout suckers must be taken from roots started early in February and treated in the same way, using a compost of sandy loam and rotten manure, with a little sand and bone-meal, and manure-water when the pots are full of roots. In potting, the growing point of the rhizome should be just covered and space allowed for a later top-dressing, for the first and best roots start from this point, and it is these that need feeding. The conditions of success in pot culture are, to alternate the times of growth and rest, never to overpot, and not to over-water newly potted plants. Copious watering is good except in winter and with newly started plants; these need care, and syringing early in the day is better than too much water until the roots have a firm hold of the soil. Then they may be richly fed, whether in pots or in the open air, and being gross feeders frequent doses of liquid manure and soot-water are necessary to their finest development. In the south of Europe the very strongest manures seem to do no harm, and are used mixed with sulphate of iron to prevent unpleasantness.

Wintering. With the early Cannas there was little difficulty as to wintering. They were kinds of great vigour and some so nearly hardy that in southern gardens of light soil they would often pass the winter beneath a thick layer of litter or coal-ashes. Such kinds as *C. Ehermanni* and the forms of *C. Annei* will stand the winters of Devon and Cornwall in the open air. But in the present large-flowered strain something of this vigour has been lost and these smaller rhizomes cannot be taken up and stored "just like Potatoes," whatever was once the case. These roots are injured by undue heat or moisture, shrivelling away if too dry and rotting if too wet. To maintain the happy medium is easier in pots or buried in light soil, and this is the best way, choosing a place secure from frost, from dry heat, and from drip. Pot-grown plants are sent to rest by withholding water and keeping a lowered temperature, being otherwise left alone (but not under the greenhouse stage) until the young shoots start again. The spotted kinds are the most delicate at the root, and in general the yellows are less robust than the reds, and the purple-leaved than the green-leaved sorts. With a little care however it is as easy to store Cannas from November to March as it is tuberous Begonias.

Increase. Nothing is easier than to secure a stock of Cannas. The rhizomes may be divided at almost any time, and every sucker—or with scarce kinds every eye—removed with a heel will make a plant. The usual way is to divide old plants in early spring precisely as with Dahlias, each crown being started in a single pot of light soil, with bottom heat and a temperature of 60° to 65°. There is little risk of loss in this way, but in ordering dried roots from a distance they sometimes come bruised or partly decayed; in this case the injured part should be cut away, the wound dusted with charcoal powder, and the sound part started into growth without delay—the only sure way of stopping the mischief. Though seeds ripen under glass, especially if the flowers are hand fertilised, they are not much used as a means of increase but may be sown as soon as ripe in strong bottom heat. Various means are adopted to facilitate the piercing of the hard outer husk, such as filing, or soaking the seed in water for a couple of days. Fresh seed sown in spring mostly germinates well, but it fails in proportion as it becomes stale. The seeds grow somewhat slowly at first though the strongest will flower in the first year and all in their second season.

Kinds. The list of these is now perplexing, there being more names than distinct kinds. The following are among the best in all colours, their flowers large and of good colour, while many of them have received official awards from the Royal Horticultural Society.

Gladiolus-Flowered Cannas.—*Alphonse Bouvier*, bright crimson, good in winter; *Ami Jules Chretien*, salmon-pink with sometimes an orange shade; *Antoine Barton*, yellow spotted crimson, with a good constitution for this class; *Aurora*, bright chestnut-red; *Beauté Poitevine*, intense crimson-scarlet; *Black Beauty*, small flowers but very fine dark leaves; *Black Prince*, very dark crimson, the best in this shade; *Buttercup*, pure yellow, opening early and blooming late; *Comte de Bouchaud*, flowers of great substance and one of the best spotted kinds; *Duchess of Marlboro Improved*, a good shade of pink; *Duchess of York*, yellow spotted red; *Duke of York*, rich carmine with white featherings; *Duke of Marlboro*, a dark crimson shaded chestnut; *Duke Ernst*, bright red with dark foliage; *Elizabeth Hoss*, yellow heavily spotted with red, one of the best of its class; *Jean Tissot*, intense vermillion; *Koningen Charlotte*, a seedling from *Madame Crozy*, flowers good in winter, red edged boldly with yellow; *Madame Crozy*, old but still among the best, flowers very lasting, bright scarlet narrowly edged with yellow; *Mrs. F. Dreer*, a good spotted variety raised in America ; *Marcus Micheli*, very fine orange-scarlet spotted with carmine and bordered with yellow, taller than most ; *Mosaic*, clear yellow netted and spotted scarlet ; *Oscar Dannecker*, flowers deep orange and very dark foliage ; *Papa Crozy*, large flowers of orange-scarlet and purple leaves ; *Paul Bert*, flowers amber yellow, leaf deep bronze ; *Paul Meylan*, clear amber yellow ; *Philadelphia*, one of the best reds ; *President Carnot*, flowers cinnabar-red, rich purple foliage ; *Prof. Hugo de Vries*, bright rosy carmine; *Progression*, an older kind, orange red with crimson blotches, good for spring flowers ; *Riese von Stuttgart*, chestnut edged yellow ; *Reichskanzler Fürst Hohenlohe*, among the best pure yellows, with flowers opening well together ; *Roi des Rouges*, flowers deep blood-red ; *R. Wallace*, yellow faintly spotted ; *Sophie Buchner*, a vigorous old kind with crimson-scarlet flowers very broad in petal. The long-sought pure white Canna now seems near at hand, *Meriem Lombard* in which the white was due to a sort of bleaching, having given place to *Boule de Neige*—a pale yellow fading to creamy-white—and now to *Mt. Blanc*, a new American seedling with large cream-white flowers and bright green foliage. American growers have also been working to improve the pink forms, using Canna *Pink Ehermanni* with success in *West Grove*, *Betsy Ross*, and others which have not yet reached us. In foliage one of the best new darks is *Brandywine*, with deep purple leaves and fiery flowers of good size and substance ; *Mt. Etna*, *Chautauqua*, and *Hiawatha* are also good for their dark foliage and handsome flowers.

Good Winter Kinds.—Messrs. Cannell of Swanley kindly send us the following list of kinds flowering well in winter and early spring. *Black Prince ; Duke Ernst ; Elizabeth Hoss ; Hesperide*, orange and crimson ; *J. B. Van der Schoot*, yellow spotted red; *Jean Tissot ; Mlle. Berat*, rosy-carmine; *Mirifique*, of dwarf habit, flowers orange-red bordered yellow; *Mrs. G. A. Strohlein*, amaranth-red; *Niagara*, red with yellow edges; *Oscar Dannecker ; R. Wallace ;* and *Wilhelm Bofinger*, orange and scarlet. Those undescribed appear in the previous list.

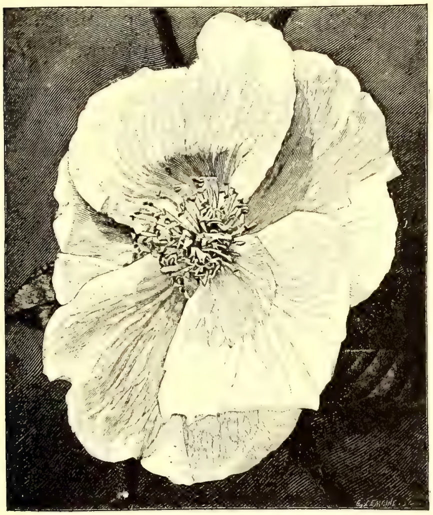
(*To be continued.*)

THE PINK CHEROKEE ROSE

(*R. lævigata* var. *Rose-Anemone*).

THIS lovely single Rose is at once a herald and a foretaste to those who would fain see our raisers leave the beaten track and devote more of their attention to the crossing of wild Roses. Though of uncertain origin—having been introduced from Japan in 1896 by J. C. Schmidt of Erfurt—it is evidently a cross, between the Cherokee Rose (*R. lævigata*) of China and some unknown Tea-rose which has given its free-flowering habit. Until well established upon a lofty wall or tall tree, *R. lævigata* is too well known as a shy bloomer, whereas this fine hybrid form flowers freely in its second year and is hardier and vigorous in growth. Budded on the *De la Grifferaie* stock, its shoots run to 5 or 6 feet the first season, and if undisturbed yield a mass of bloom in the following May and June. How beautiful are the large blossoms fully 4 inches across, opening with a rich rosy-crimson shade, paling later to silvery-rose with veinings and marblings of light and deeper pink! Appearing from the middle of May throughout June, before the sun has attained its full power, these charming blossoms last longer than in the later-blooming single kinds. Were it not for the fact that (in common with many other single Roses) the flowers close at night, this variety would be of value for cutting.

In the garden its earliest blossoms lend charming contrast to other early species and varieties, such as *R. spinosissima altaica*, *R. acicularis*, *R. rugosa* and its white form, *R. alpina*, *R. sericea*, and *R. canina* var. *Una*, etc. A happy idea would be to plant a mass of "*Rose Anemone*" in the middle of a large bed, and around it that lovely single Rose—*spinosissima altaica*. The central mass might be tied to supports, or better yet left to scramble over logs and tree-roots which would not mar its grace of habit. Another and equally pretty way would be to plant it with *Jersey Beauty*—sometimes called the Yellow Cherokee Rose—this last to trail around the outside of the bed and mingle its clear yellow flowers with the tender pink ones of the centre. Even better than a formal bed would be a gently sloping bank planted in this way, with the fine green foliage beautiful at all seasons while the pliant shoots lend themselves to any form of training. The charm of the best single Roses is only beginning to be felt in gardens, but in ways such as these the Rose-garden will soon become a more picturesque creation than in the old days of trim beds and set forms.


ROSA LÆVIGATA "ROSE ANEMONE" AT GRAYSWOOD, HASLEMERE.
(*Engraved for "Flora."*)

The foliage of our Rose is handsome, some leaves measuring 3½ by 1½ inches, of a rich myrtle-green, and glossy—a character inherited from *R. lævigata*. The dark-brown shoots are freely armed with strong thorns and minor prickles. Planted in deep rich soil it grows so vigorously that, apart from its flowers, it is of value as a sub-evergreen. For the conservatory, pillar-trained plants in pots are a pretty feature and in a cool place they last in beauty for 3 or 4 weeks. Though apparently sterile as a seed-bearer, this newcomer will no doubt play its part as a pollen-parent in the near future, for there is yet a wide field to work upon in the many fine wild Roses which are too seldom met with. The late Mr. Girdlestone was a strong believer in a future race of mildew-proof Roses, raised by crossing such kinds as *nitida*, *lucida*, and *lutea*. Were proof needed, we see what can be done in a few short years by cross-breeding the remarkable hybrids of *R. Wichuriana*, and who shall say that results fully as good may not await those who devote themselves to work of this kind. Some while ago there was in flower at Kew a lovely Rose—a cross between *R. microphylla* and *R. rugosa*—with huge Azalea-like blossoms of a delicate blush-colour; so far as I know this has never been distributed. Another remarkable Rose-hybrid is *Gottfreid Kellar*, in which we have the free and half-climbing habit of the hybrid Tea-rose and the single flower of a Lady Penzance Briar. Though our collections are overburdened with varieties, there is yet ample room in gardens for Roses of this description, which take us away from the formal exhibition flowers and give in their place a simplicity and grace of form charming those to whom Nature and Beauty are as one. W. EASLEA.

Waltham Cross.

ZYGOPETALUM, WITH A PLATE OF Z. DISCOLOR ATROCŒRULEUM.*

SHOWN by Messrs. Sander before the Royal Horticultural Society in April last, the plant from which our artist's drawing was made gained an award of merit from the Orchid Committee. From the introducers we learn that, though collected in Brazil some years ago, this fine variety had never before flowered in this country. The plant grows very freely in an intermediate house, potted in pure leaf-soil surfaced with fine heads of living sphagnum. In our review of the genus by Mr. O'Brien, this plant is described under its sectional name of *Warczewiczella discolor*.

Zygopetalum proper (or *Enzygopetalum*) was founded by Hooker on *Z. Mackaii*, commonly spelt *Mackayi*, in 1827. As at first understood the genus was easily handled, but the subsequent addition of groups formerly regarded as distinct has resulted in a union of forms so dissimilar as to make it a complicated and confusing study. For ease of classification botanists are perhaps justified in placing together plants dissimilar in the eyes of the gardener, but for garden purposes the union under one name of groups so unlike as Huntleya, Bollea, Pescatorea, Promenæa, and others of less moment, is undesirable. So thrown together, it requires an expert to decide where each belongs, whereas if grouped under separate names, as sections, with each its own peculiarities of structure or manner of growth, the various members become at once recognisable. The differing needs of some of these sections also require that for garden purposes they should be classed under their old names, and this I propose to do in a rapid review of the genus.

ZYGOPETALUM.—All true Zygopetalums have well-defined pseudo-bulbs bearing bright green leaves, and, being evergreen, are ornamental at all seasons. In plants of the *Mackayi* class the bulbs are clustered, whereas in *Z. maxillare* and a few others, they are more or less distant on rhizomes. None of them are difficult to manage, indeed those of the first-named class are among the most easily grown of Orchids. Plants of this strong-growing *Mackayi* section thrive in well-drained pots and a compost of equal parts of loam-fibre, peat, and sphagnum-moss, with a sprinkling of silver sand. *Z. maxillare* and its forms, fond of climbing the trunks of low tree-ferns, are often imported holding to the stems. When received in this way the fern-stems with the plants upon them should be fixed firmly in pots and secured with sphagnum-moss. If imported loose, these kinds and the similarly-growing *Z. rostratum*, may be placed on rafts

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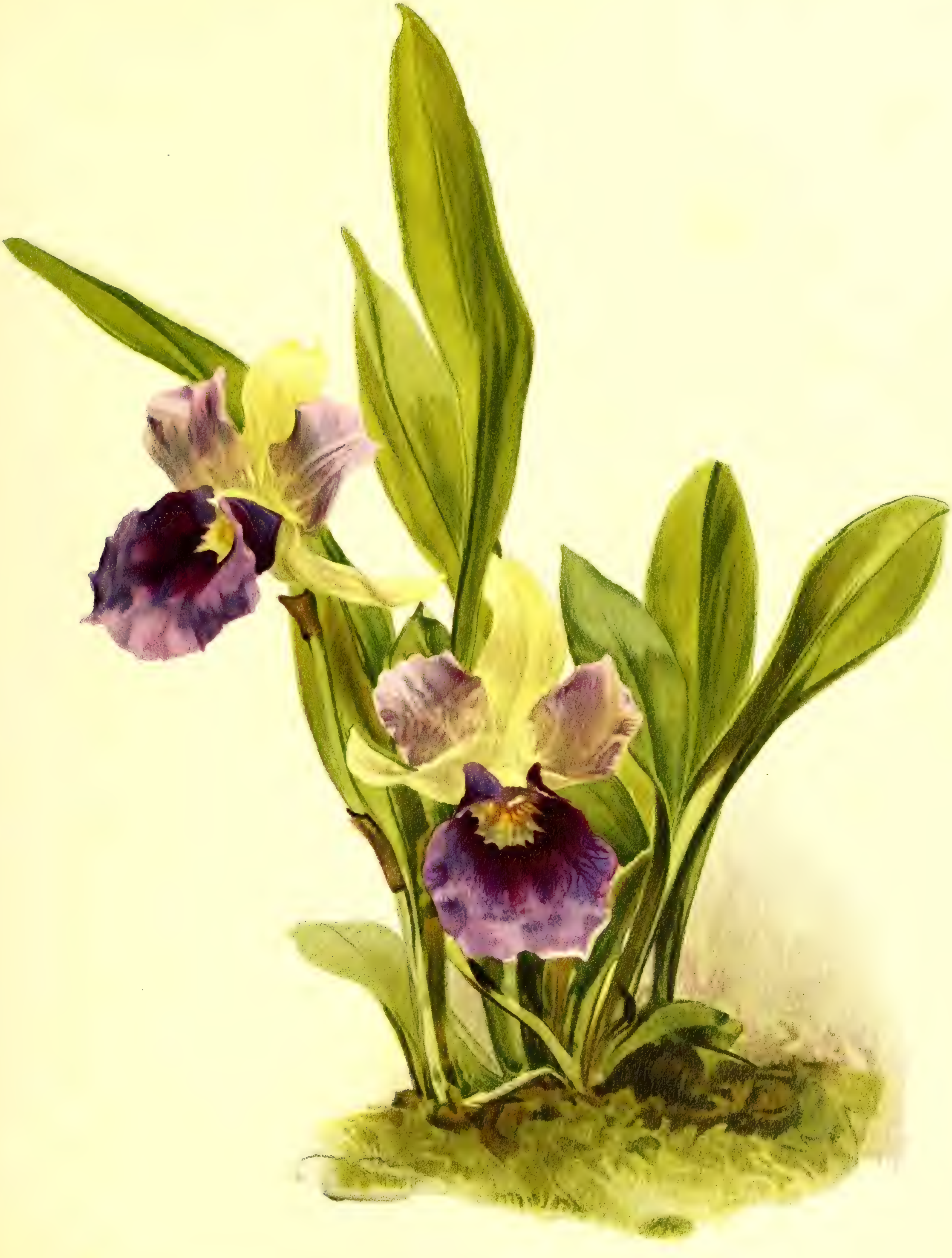
* From a drawing by H. G. Moon at St Albans.



ZYGOPETALUM DISCOLOR — ATROCOERULEUM

bedded with sphagnum and peat, the rafts being secured slantwise on pots and filled in with sphagnum-moss ; or, if a sufficiently moist position can be found, they may even be suspended. The hybrids of Zygopetalum all thrive best in pots. The plants need a copious supply of rain-water at the root when in growth and being evergreen they must never be dried off even in the resting season. All of them should be shaded from direct sunlight during summer, and especially the *maxillare* and *rostratum* sections which require the warmest and shadiest part of the Cattleya or intermediate house in which all Zygopetalums are grown. Species :—

Z. brachypetalum.—Habit of *Z. Mackayi* but slighter. Flower-spike often 18 inches high. Flowers 2½ inches across, sepals and petals green barred with red-brown, lip white tinged with mauve and blue veins. Brazil.

Z. Burkei.—Scape erect, 18 inches or more high, and bearing several flowers between 2 and 3 inches across. Sepals and petals green, veined and spotted with purple ; lip white with purple lines on the crest. Roraima, British Guiana.

Z. crinitum.—Comes near *Z. Mackayi* but is easily known by its shorter spikes which begin to flower nearer the pseudo-bulb, and by its aromatic fragrance like Aniseed, that of *Mackayi* being sweet as a garden Hyacinth. Flowers 3 inches across ; sepals and petals green, barred with purple-brown ; lip white, bearing a veining of fringed hairs varying in colour from violet to rose. Forms of this have been named *splendens*, *cœruleum*, etc. Brazil.

Z. graminifolium. — Pseudo - bulbs small, leaves long and narrow. Scape sometimes 2 feet in height. Flowers 2 inches across and rather like those of *Z. maxillare.* Sepals and petals green heavily marked with chocolate-purple ; lip blue with white markings. Brazil.

Z. grandiflorum.—A very distinct species with angular pseudo-bulbs 3 inches long, bearing broad leaves a foot or so in length. Flower-stem short, mostly three or four-flowered ; flowers 3 inches across. Sepals and petals yellowish-green with longitudinal reddish-brown lines ; lip white, with several raised purple lines. Crest yellow with red markings and projecting teeth in front. Columbia.

Z. intermedium.—A form between *Z. Mackayi* and *Z. crinitum*—itself sometimes figured as *Z. intermedium.* It comes near *Z. Mackayi* and has the same odour of Hyacinths. Sepals and petals tinged green and barred with chocolate-purple. Lip white, with radiating spotted lines of purple. Brazil.

Z. Jorisianum.—A distinct species differing from others in the form of the lip. Pseudo-bulbs 3, and leaves about 9 inches long. Scape erect, flowers 2½ inches across. Sepals and petals green heavily marked with chocolate-purple ; lip three-lobed, fringed, creamy-white tinged with yellow on the side lobes ; crest purple. Venezuela.

Z. Lindeniæ.—Allied to *Z. rostratum* and with similar rather small pseudo-bulbs borne on rhizomes, and short flower-stems with two to four flowers of 4 inches across. Sepals and petals white tinged with rose-pink ; lip large, pointed, white with rose lines. Tropical America.

Z. Mackayi.—The first and still the finest of the genus, esteemed in gardens for its strong growth and tall bloom-spikes. Flowers 3 inches across, large, fragrant, and lasting. Sepals and petals green, barred and blotched with purplish-brown ; lip broad, white, streaked and spotted with violet. Brazil.

Z. maxillare.—Pseudo-bulbs distant on rhizomes. Stems a foot or more with flowers 2½ inches across. Sepals and petals green blotched with chocolate-brown ; lip violet-blue, lighter at the margin ; crest fleshy and violet. Brazil. Variety *Gautieri* (*Z. Gautieri*) is a good form with finely coloured flowers ; and variety *Sanderi* a slender form, with rounder pseudo-bulbs and having the lip of the flower a bright indigo-blue.

Z. Murrayanum.—One of the smallest of the genus as regards flower. Habit compact ; erect stems of about a foot, with flowers about an inch across. Sepals and petals green ; lip white with a few purple markings. Brazil.

Z. rostratum.—The representative of a distinct section once separated by Reichenbach as *Zygosepalum rostratum*. Rhizomes creeping, pseudo-bulbs oblong, leaves lanceolate. Scape short, with one to three flowers 3 to 4 inches across. Sepals and petals similar, linear-lanceolate, white at the base and brownish beyond, tinged with green ; lip large, cordate-acuminate, white, with several rosy streaks in front of the crest, which is yellow striped with purple. Guiana.

Z. triste.—Flowers 2½ inches across. Sepals and petals dark chocolate-purple ; lip violet with lighter freckling ; crest white with blue lines. Brazil. Syn. *Z. Protheroeanum.*

Hybrids.—In crossing, Zygopetalums behave somewhat strangely, for while prolific when crossed with closely allied plants, those more distantly related (such as Odontoglossum) seem to have no influence upon them. I have seen plants said to come from *Z. Mackayi* × *Odontoglossum crispum*, in which, beyond a suggestion of crossing traceable in the colour, the flowers were identical with those of *Z. Mackayi. Colax jugosus* has been a fertile agent and several of the prettiest Zygopetalum hybrids have been derived from it. All show variations of the same greenish sepals and petals, marked with brown and purple and the white lip tinged with violet and in some cases exquisitely veined with violet-purple ; it is therefore not necessary to describe them in detail, the parentage in most cases giving sufficient indication as to what the flowers are like. The hybrids of *Z. rostratum* however show a rosy-crimson tint in their colouring.

Z. × *Ballii* (nat. hyb.) *Z. maxillare* × *rostratum.*
Z. × *Clayi* – *crinitum* × *maxillare.*
Z. × *Gottianum* – *maxillare Gautieri* × *Perrenoudii.*
Z. × *leucochilum* – *Mackayi* × *Burkei.*
Z. × *pentachromum* – *Mackayi* × *maxillare.*
Z. × *Perrenoudii* and var. *Cecil Rhodes* – *intermedium* × *maxillare Gautieri.*
Z. × *Roeblingianum* – *rostratum* × *maxillare Gautieri.*
Z. × *Sanderi* – *Perrenoudii* × *Mackayi.*
Z. × *Sedeni* – *Mackayi* × *maxillare Gautieri.*

Zygo-Colax (*Zygopetalum* × *Colax*) :—
Z-C. × *Amesiæ* – *Z. brachypetalum* × *C. jugosus.*
Z-C. × *Amesiana* – *C. jugosus* × *Z. brachypetalum.*
Z-C. × *leopardinus* – *Z. maxillare* × *C. jugosus.*
Z-C. × *Veitchii* – *Z. crinitum* × *C. jugosus.*
Z-C. × *Wiganianus* – *Z. maxillare Gautieri* × *C. jugosus.*

Zygonisia. *Z.* × *Rolfeana* – *Z. maxillare Gautieri* × *Aganisia lepida.*

Zygobatemannia. *Z. Mastersii* – *Z. crinitum* × *Batemannia Colleyi Lindl.*

Warczewiczella.—These are leafy plants with undeveloped pseudo-bulbs or stems, clad with broad bright-green leaves, the longer a foot in length and the lower ones sheathing the base. The growths are closely tufted and quite unlike the pseudo-bulbs of Zygopetalum. Flowers on stems shorter than the leaves, mostly solitary, and from 2 to 4 inches across. In this and the sections Huntleya, Bollea, and Pescatorea, the plants are of similar habit and without pseudo-bulbs, so that the same cultural directions apply to all. They thrive in a warm shady part of the intermediate house, with an even, moderate temperature at all times. Bright sunlight is harmful but a clear subdued light is essential. They must be kept moist at all times, with copious supplies of rain-water while growing. Syringing and watering overhead are injurious, but spraying morning and night with one of the special appliances made for the purpose, is helpful in warm weather. The plants should be potted in equal parts of good orchid peat and live spagnum-moss, and must be kept well above the edge of the pot or basket used for them. Species :—

W. amazonica.—A very fine species bearing large white flowers with purple lines at the base of the lip. Syns. *W. Lindeni*, and *Zygopetalum Lindeni.* Tropical America.

W. aromatica.—Flowers white with blue markings on the lip. Panama.

W. candida.—Flowers 2 inches across, white, with the margin of the lip light violet and a striated blotch of the same colour showing in the centre. Brazil.

W. cochlearis.—Flowers white, with a purple tinge and lines on the lip. A very handsome variety is known as *W. Gibeziæ* ("Lindenia" Vol. IV. *Zygopetalum Gibeziæ*) its large flowers distinctly veined with dark blue upon the lip. Tropical America.

W. discolor.—One of the best because of its many flowers. Scapes 6 inches long, with the sheathing bracts generally seen in this genus. Flowers white tinged with rosy-lilac on the petals and purplish-rose on the lip. Costa Rica.

W. discolor atrocærulea.—A fine variety for which Messrs. Sander of St. Albans received an award of merit at the Royal Horticultural Society. Flowers white, petals tinged with violet, lip dark purplish-violet. This plant is finely figured in the coloured plate, under its generic name of Zygopetalum.

W. marginata.—Flowers white, with a deep rose margin to the lip and a purple disc. Syn. *Warrea quadrata*. Central America.

W. picta.—Allied to *W. discolor*. Sepals greenish, petals white; lip yellowish with purple lines upon the margin. Tropical America.

W. velata.—Sepals and petals white tipped with green; lip white with a broad rosy margin and rosy lines on the disc.

W. Wailesiana.—Flowers white with a bright violet disk to the lip, which is concave. Sepals and petals reflexed. Brazil.

W. Wendlandiana.—A fine species with white flowers, the type having a broad rosy-purple band down the lip, and the variety *discolor* a blue band. Costa Rica.

HUNTLEYA.—This section is one of the oldest, and most of its members may be grouped around *H. Meleagris*, seeing that they differ little save in the size and colour of their flowers, indeed it is an open question whether most of them should not be considered as forms of that species. All those in cultivation have star-shaped wax-like flowers, varying in the different species from 2 to 6 inches across. Most of them have longer rhizomes separating the growths than in the Bolleas, this being traceable to their fondness for tree-climbing. Culture as for Warczewiczella. Species:—

H. albido-fulva.—Flowers 3 inches across, yellowish marked with brown. Brazil.

H. Burtii.—Flowers 4 inches across, the segments whitish at the base, yellow outwardly and bearing many raised chestnut-brown blotches, the petals also bearing purple markings on a white ground at the base. Costa Rica.

H. Gustavi.—Flowers yellow with transverse reddish blotches on the petals; sepals tinged with reddish-brown. A small species found by Wallis in New Granada, the singular and little known *H. apiculata* being from the same region.

H. Meleagris.—The type species. Flowers 4 inches across, yellow heavily blotched with red-brown. Base of petals white with short purple lines. Tip white with chestnut-red apricot half. Brazil.

H. Wallisii.—This plant and its variety *major* are the finest of the forms of *H. Meleagris*, the largest having flowers 6 inches across, yellow marked with reddish-brown and with purple lines on white at the base of the petals, as is peculiar to this section.

BOLLEA.—A small group of Orchids in which the scape bears only a single flower. The sepals and petals are broad and the lip rounded and shortly clawed, with a prominent fleshy crest on the disk and a short thick column. There are few kinds, all from tropical America.

B. coelestis.—Flowers 3 to 4 inches across, sepals and petals bright blue, with the marginal tips white and a violet lip. It blooms in June and July and lasts a long time in beauty. Columbia.

B. Lalindei.—Flowers blue, with a darker purple lip and orange crest.

B. Lawrenceana.—A very beautiful species, first flowered by Sir Trevor Lawrence, Bart. Sepals and petals broad; flowers 4 inches across; white, with the outer points of the segments rosy-purple. Crest yellow; front of lip claret-red.

B. Patini.—Flowers white suffused with lilac; crest yellow.

B. violacea.—Flowers dark violet blue. Syn. *Huntleya violacea*.

PESCATOREA.—These plants have the leafy habit of growth and the large showy flowers of Bollea, the chief difference being in the form of the lip. They are chiefly from the moist upland regions of New Granada and Ecuador, and their cultural requirements are as for Warczewiczella. The species were mostly described by Reichenbach under Pescatorea though later included, by him and by other authors, under Zygopetalum. Their synonyms are too numerous to mention without quoting authorities; some have even been classed under Batemannia, where they are quite out of place. Species :—

P. Backhousiana.—Flowers creamy-white tipped with purple; crest yellow.

P. bella.—Flowers pale blue with the outer halves of the segments violet.

P. cerina.—Flowers creamy-white with a yellow lip; segments sometimes tipped with rose.

P. Dayana.—A variable species generally white with green tips to the sepals and a purple crest to the lip. Variety *candidula* is pure white, and variety *rhodacra* white tipped with purple and with a rosy-purple lip.

P. Dormaniana.—Flowers white, with sulphur-yellow tips to the sepals, and a yellow crest.

P. Gairiana.—Flowers of deep violet-purple.

P. Klabochorum. — Flowers white, with crimson tips to the sepals and petals, and dark maroon hairs studding the lip.

P. lamellosa.—Flowers creamy-white; lip with a yellow crest.

P. Lehmanni. — One of the handsomest species. Flowers large, light violet in colour, with whitish lines.

P. Ruckeriana.--Colour white, with the outer portion of the segments rosy-purple; lip purple with a whitish callus.

P. Roexlii.—Flowers creamy-white with violet blotches on the sepals and petals; lip purple and bearing a horn-like process on each side of the front, as in *P. Schroderiana.*

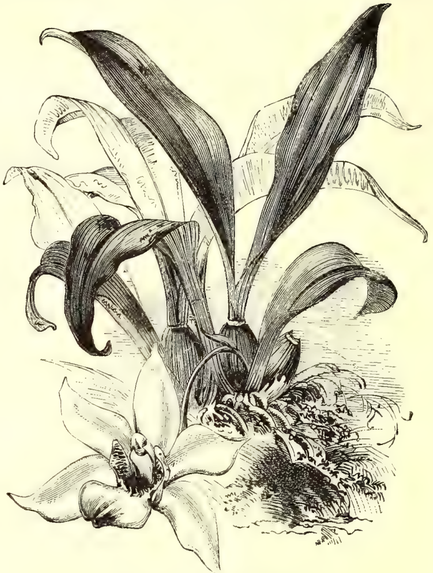
P. Russelliana.—Flowers white with reddish-purple tips to the sepals and petals, and a reddish-purple lip.

P. Schoderiana.—A fine species in which the white flowers bear a large rosy-purple lip furnished with short horn-like white tips on each side of the front.

P. triumphans.—Sepals and petals white with violet-purple tips; lip purple.

P. Wallisii.—Flowers creamy-white tipped with purple.

Promenæa.—This section comprises a small group of dwarf compact-growing plants only a few inches in height, with clustered greyish-green pseudobulbs and evergreen leaves a few inches long. The flowers are comparatively large, produced on short stems, and grouped closely round the plants. These pretty little gems should be grown in orchid pans or baskets, and suspended in the Cattleya house to bring them near the glass, a position in which all very dwarf plants thrive best. They are evergreen and need no special care beyond a restricted supply of water when not in active growth, and there is no



Promenæa Rollissoni.

need of the drying-off essential for deciduous plants. Flowers of thick texture, 1½ to 2½ inches across. Species:—

P. lentiginosa.—Allied to *P. stapelioides.* Flowers whitish, distinctly barred with reddish-purple.

P. microptera.—Sepals and petals creamy-white; lip white with dull red markings.

P. Rollissoni.—Sepals and petals pale yellow; lip whitish spotted with crimson.

P. stapelioides.—Flowers yellowish-white thickly barred with dark chocolate-purple.

P. xanthina.—Flowers bright yellow with purple markings at the base of the lip. Syns. *P. citrina* and *Zygopetalum xanthinum.*

P. × *Crawshayana* (*stapelioides* × *xanthina*) the first hybrid of the section and one of the finest of the Promenæas. Flowers 2½ inches across, pale yellow changing to bright light yellow with reddish-purple markings on the inner parts of the segments, the lip being darkest.

Keferstemia and one or two other small groups of little moment horticulturally, are also included in Zygopetalum.

JAMES O'BRIEN.

Harrow on the Hill.

PITTOSPORUM.

THESE evergreen shrubs or small trees of the southern hemisphere add much to the interest of outdoor gardens in the warmer and seashore districts of Britain and Ireland, where many of them are so hardy that they thrive even in exposed positions. They grow freely and if given plenty of room and some attention in shortening the leading shoots in their early stages, in a few years they form fine bushes furnished to the ground. While small they are best grown in a place apart and moved annually for four or five years to encourage fibrous roots. Under this treatment they eventually become nearly double the size of such as are put at once into permanent places. We grow them in this way in our home nursery till they are 5 or 6 feet in height. As to hardiness, some of the varieties have been growing at Castlewellan for over thirty years and during that time have never been injured by the weather, but, if unprotected, rabbits will destroy their beauty in a very short time, and where black swans, Canadian geese, golden pheasants, and water-fowl have access to them, they will eat the leaves as high as they can reach during severe cold and when snow is on the ground. These shrubs are useful for covering walls as well as in the open, and might be tried in this way in cold districts. They thrive in a compost of loam, leaf-soil, and spent manure. There are many kinds, over twenty being grown in the gardens at Castlewellan, but the following half-dozen are among the best.

P. Mayii, the first variety planted in the grounds here, is now about 25 feet high with a circumference of nearly 70 feet. It is fine in form, with the lower branches sweeping the turf, and blooms towards the end of April and early in May, the flowers being inconspicuous though borne in great quantity. In colour they are a dark chocolate-purple and towards evening emit a strong honey-like fragrance which may be detected often 50 yards away, though during the daytime it is so faint as to be hardly perceptible.

P. Colensoi is one of the most beautiful evergreen shrubs we possess, the habit of the plant, though dense, being light and graceful. When in vigorous growth it makes shoots 2 feet long in the season, notwithstanding its lateness in starting into growth. Beginning only in July, by the end of October its long leafy shoots are matured, and that in all directions upon a plant 10 feet or more in diameter. The leaves are small, silvery-green, and contrast charmingly with the deep-black stems. When first grown at Castlewellan it was wintered for a couple of years in a large orchard-house.

When more plentiful however it was tried in the open, and has resisted the severest frosts and the roughest gales. It comes from New Zealand, and the largest plants in the garden here are about 10 feet in height and 30 feet in circumference.

P. undulatum is the most vigorous of all the kinds that I know, with leaves of a bright glossy green and easily distinguished by their wavy outline. It bloomed with us for the first time last spring, when the flowers proved to be of a light purple colour and arranged in clusters of three. It is a good shrub for exposed situations or as a shelter for more delicate things, and deserves to be far more widely known. The largest plants here were planted fourteen years ago and are over 16 feet in height and 40 feet in circumference.

P. nigrescens seems to come between *P. Mayii* and *P. Colensoi.* The leaves are of medium size and bright glossy green upon black stems. It is a fast-growing plant, requiring some shelter even at Castlewellan, for it grows late into the winter and the tips of the shoots are sometimes caught in severe frost.

P. eugenioides, like the last kind, also needs some shelter, though only once have I known it to be killed, and that was during the severe cold of 1895. It was then in a low damp part of the grounds and grew with such vigour that the wood was not well ripened; on higher ground it has passed through most winters uninjured. The leaves are large, 5 inches long and an inch wide, and a light yellowish or grey-green colour. The flowers, borne in clusters, are a creamy white and fragrant, and although the plant blooms regularly it has never ripened seed. It comes from New Zealand where the Maoris are said to use the bruised leaves and flowers, mixed with fat, to anoint their bodies. The largest plant at Castlewellan is 12 feet in height and 23 feet in circumference.

P. eugenioides variegatum is much hardier than the type and one of the best and handsomest of variegated shrubs. It is of compact growth, needing but a small space and little pruning. The leaves are large and their white centre beautiful in contrast with the dark stems. The largest plant is 8 feet in height and 20 feet in circumference.

P. Tobira, unlike the others—which come from Australia and New Zealand—is a native of Japan, and the best known of all. Along the south and west coasts of Britain it is hardy almost everywhere, resisting anything under 20° of frost and flowering freely during summer and autumn. The leaves are deep green, thick, glossy, and evenly rounded, and the flowers creamy-white about an inch across, come as clusters at the tips of the shoots and with a strong scent of orange-blossom. It begins to flower while quite small, and grown as a pot-plant under glass is often in bloom in February. It is a stiffer grower than the rest, rarely exceeding 10 to 12 feet unless against a wall, where it may reach 20 feet or more.

The following kinds are also growing at Castlewellan, and do well:—*P. Buchanani*, *P. coriaceum*, *P. crassifolium*, *P. lucidum*, *P. macrophyllum variegatum*, *P. Ralphii*, and *P. rigidum.*

T. RYAN.

The Gardens, Castlewellan.

THE LOQUAT (*Photinia japonica*).

By a strange coincidence our article on the Loquat was in type when from Lady Rosamond Christie we received perfect fruits of fair size and excellent flavour, ripened in the open air at Tapeley Park, Instow, North Devon. Lady Christie writes :—" The Loquat flowers every year but has never fruited here before. The tree is 16 years old and 10 feet high, planted against a south wall in the kitchen garden, and the ripe sprays came upon a part of the plant which is screened from the west by a hothouse. It is a warm nook, but the garden lies high and gets a good deal of buffeting, for we are close to the sea. The plant was raised as a cutting from one brought direct from China." Mr. Fitzherbert has been able to tell us of another instance in which a tree, since dead, fruited in the gardens at Mt. Edgcumbe, Plymouth, but these seem the only cases of the kind that have occurred and, while so exceptional as not to modify the sense of our article, they are of interest as showing that under certain conditions the fruit may ripen in the open air in this country.

Bearing pleasant fruit and flowers, of good form and vigorous constitution, this fine evergreen tree from China and Japan should be worth a place in our glass-houses, where room is often found for shrubs that are of less value. It may be seen here and there in the open air, in sheltered gardens along the south coast, as on the walls of Battle Abbey near Hastings, where it reaches a height of over 30 feet, and again in the Bishop's Garden at Chichester, and at Southampton, where a fine tree nearly 30 feet high is growing against a house-front—but these trees seldom flower even in the extreme south-west and never seem to ripen fruit. For though a wall-grown plant at Levant Lodge, Worcester, set a few clusters after the hot summer of Jubilee year they were destroyed by frost while still unripe. Save in such sheltered coast gardens the Loquat is too tender for the open air, suffering even at Kew upon a warm south wall. Under glass however it may be grown in a few years into one of the finest of ornamental trees, superior to the Orange in appearance and far less trouble to grow, while its fruits are borne freely and are so distinct from most garden fruits as to be welcome for the table. In the south of France a good tree of eight to twelve years will carry 60 to 100 lbs. weight of fruit in a season, and even allowing for a reduced yield under changed conditions, trees loaded with fine clusters have ripened their fruits at Stowell House, at Cottingham Grange, and other places within recent years, and that not a chance yield but from year to year, with sometimes two crops in a season. Added to this the Loquat travels well, ripens earlier than almost any other fruit (April to June), and is free from the diseases which make modern fruit culture so difficult and costly.

In the days of Loudon there was sufficient reason for this neglect in the poor quality of the fruits, but he suggested the raising of seedlings and their careful selection in gardens of the south of Europe, in the hope of obtaining a good dessert fruit. This has been done, and a number of fine named kinds are now to be had in the south of Europe, Algeria, and California, kinds in which the pulp is improved in texture, quantity, and flavour, the large cluster of "stones" which is such a drawback to the common form being reduced to one or two small pips. The fruits are oval or rounded, of about the size of a Greengage, and vary in colour from lemon-yellow to that of a ripe Apricot with a downy or smooth skin according to variety. Their flavour is pleasantly acid and refreshing, with abundant juice when allowed to hang until fully ripe, and they come in fine clusters of 5 to 10 fruits each. Freed from the seeds the pulp makes an agreeable preserve. Seedlings begin to bear at the fifth or sixth year, but for this country stout young trees of the finer sorts only should be imported from good nurseries in the south, for while of more vigorous growth, seedlings are of uncertain quality. Grafted on its own roots the tree makes a handsome standard with a spreading umbrella-head, but is longer in coming to fruit. Grafted on the Quince—to which it is allied—the tree takes bush-form and fruits early, while grafting on the Hawthorn gives fragrance, but the union is less satisfactory in other ways. Visitors to the Riviera are familiar with the Loquats offered in the markets during May, and spite of the fact that these are mostly gathered by the peasants from inferior trees grown without care from chance seeds, their flavour is so new and refreshing that they find favour, spite of the offending core. But, with selected varieties, gathered from trees duly thinned and cared for, the Loquat becomes a fruit worthy of any table, and so easily grown that no one need fear to undertake its culture.

But even if it never fruited, the Loquat would be worth growing for the beauty which has made it a favourite lawn and avenue-tree wherever conditions are in its favour. There are trees in Devon and Cornwall nearly 20 feet high and as much through, and older ones of 25 to 30 feet are found here and there in the south of Europe and in California (where it is much planted in avenues), and in its own country gnarled old trees of great age exist.

For winter-gardens, orangeries, and the larger glass-houses of this country there are few finer evergreens, the large leathery leaves often nearly a foot in length, hanging thickly towards the tips of the shoots, a fine dark green above and deeply toothed in the upper part, while the under-side is covered with a rust-coloured down which is white when first seen upon the tender shoots. The yellowish-white flowers are large, coming in down-covered drooping clusters from November to January, with a scent of Hawthorn. The plants are easily grown in tubs—small as compared with the size of the tree—and after making growth in early summer they may be stood in the open, their natural form being a standard with the broad rounded head so much sought in "specimens" for the terrace or formal garden. They are quite safe in the open until well into October and the trees are better for the rest, starting to flower almost as soon as they are back under glass and ripening their fruit thence onward when helped by a little heat. They may also be grown planted out against walls and trimmed to any shape, bearing the knife so well that they are used as hedge-plants in the warmer parts of the globe, for their dense leaf and indifference to drought and ill-usage. More vigorous and ornamental than the Orange, the Loquat is far less subject to insect pests and loss of leaf, while it is so hardy as to rest content with even a glass-covered corridor in mild districts, when nothing better is available. Seed germinates so readily that the trees sow themselves in the south of Europe, but these young plants should either be carefully selected or grafted with a good named kind early in the autumn. For English growers the best way is to get young plants of a good sort from the south of Europe.

Good Kinds.—The best kind grown in the gardens of Nice is known as the *Moscatel*, with large pale-yellow fruits of musk flavour, with only one or two small seeds in the centre. The longest list of varieties—which we find in the *Lyon horticole*—comes from Algiers, where for years past much care has been given to the Loquat, and the following eight kinds are recommended :—*Telemly precoce*, large long-shaped fruits of deep yellow colour and exquisitely scented flavour. *Brunel*, a large fruit more rounded than the last, with a downy skin and pale yellow flesh of fine flavour. *Gelos*, a large fruit of pale colour, very free, juicy, and of fine appearance. *Don Carlos*, a large fruit of fine flavour. *Imbert*, an oval fruit with a very thin skin and sweet juicy pulp. *Scala*, a rounded fruit of pale colour. *St. Michel*, a long fruit of distinct pear-shape, with a thin skin of pale yellow colour and flesh almost white ; seeds few and very small. *Dauphin*, also pear-shaped, with firm juicy flesh, fine acid flavour, and few seeds.

Still further variety is found in the selected fruits of Italy and Sicily, descriptions of which are given by Sprenger in the *Bulletin de la Société Toscane d'horticulture* as follows :—*Pesca di Palermo*, long-shaped fruits with sweet pale-yellow flesh of delicate flavour and a thin skin, borne upon a tree of stout growth with ample undulated leaves. *Limoncella*, in which the fruits are lemon-shaped, very large, and the thin skin a pale shade of sulphur-yellow ; pulp abundant, nearly white in colour, with a core of three small seeds ; the tree attains a large size and is somewhat irregular in growth, flowering in December and ripening its fruits in April and May. *Conca d'oro*, with smaller fruits but in heavy clusters, very sweet and of bright golden colour, with pale yellow pulp and 2 or 3 seeds ; the tree is small and shapely, flowering in November and ripening its fruits early, these being remarkable for their Strawberry-fragrance. *Monréala*, a fruit of medium size and evenly rounded, deep yellow in colour, bronzing in the sun ; pulp of delicious flavour and very small seeds. These fruits are known as *Vanille* at Palermo from their delicate fragrance. The *Nefle à un pépin* is a late kind ripening in May upon a tree of good form ; the fruits of medium size and fine flavour, with only one seed and sometimes none at all. *Santa Rosalia*, the latest kind, ripening its medium-sized golden fruits in June ; the seeds are small and the pulp sweet and very juicy.

The botanical name of the Loquat is variously given as *Eriobotrya* or *Photinia japonica*, or *Mespilus japonicus*. The first refers to the woolly clusters of fruit and flowers, while that of *Mespilus* recalls its kinship to the Medlar—also seen in the name Japanese Medlar. B.

FLORA
AND SYLVA.

Vol. III. No. 30.] SEPTEMBER, 1905 [Monthly.

ROSE RUIN.

I HAVE now at the end of August the pleasure of seeing a colony of Tea Roses of the choicest kinds in fine health and some in flower, which, not twelve months ago were put in as cuttings. Many of them are now good stout plants, though less than one year old. They are in most cases Roses that perish on the Brier, or become so sickly as to be an eyesore—a common thing with the Tea Roses and others of *indica* origin. More than half the many Tea Roses I bought have perished on the Brier, some of them very quickly, and if they do not disappear quite they have such a hard and almost leprous look that I give them up in despair.

One result is the false idea with many that they cannot grow Roses of this class, and the loss of beauty and that of the highest kind is great, for no other Roses are quite so fair as these. There are also incidental losses from attempts to nourish the Brier with masses of manure to keep it in health, which leads our Roses to be put away as not fit for the flower-garden. The Rose catalogues which are issued by thousands every year emphasise this error, and perpetuate the custom of grafting Tea and China Roses on the Brier. Very few nurserymen in Europe sell Roses on their own roots, and often when they are asked for and sent they are found to be worked on the root, or upon *Manetti* or some other poor stock, so that the main question for Rose lovers is how to get over this difficulty.

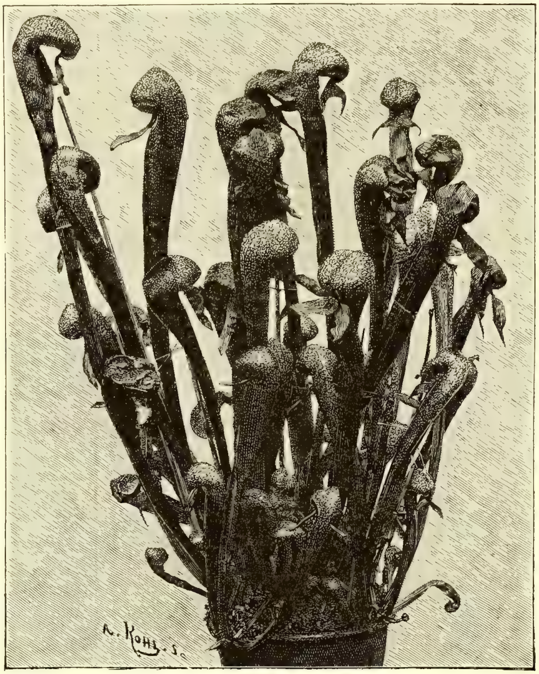
After many years experience I find it almost impossible to expect any help from the trade. The only way out of the difficulty is to take cuttings for oneself of all one's favourite Roses. Some Roses perish so quickly that it is not easy to get good cuttings before they disappear; some, like *Marie van Houtte* and *Anna Olivier*, having more of the blood of the European Roses in them, do well on the Brier. Weak cuttings will not do, we should always get them of medium size and of firm wood taken off with a heel. Favourite Roses that fail in the ordinary way should be put in as cuttings during September, or October in warm sheltered gardens, slantwise so as to keep most of the stem out of the weather, and with two or three leaves at the end only, three parts of the stem being inserted in the ground. This is the way in which my Roses were put in and in open sandy loam, and scarcely one has failed, among them being kinds extremely slow and difficult on the Brier. The few nurserymen in France and England who have these Roses on their natural roots deserve every encouragement, but the best of all ways is to strike the Roses for oneself, avoiding entirely the regulation soil of the catalogues.

The simplest way is to take a favourite Rose—say *Edith Gifford* or *Madame Hoste*, both of which are unsatisfactory on the Brier—and put the cuttings in where we wish them to grow, thus avoiding removal; that is to say, select the spot where the Roses will be welcome in all ways and put in enough to make groups of a kind, with a little silver sand round the cuttings, and if there are any hand-lights or *cloches* about, put them over as it makes the "take" a little more certain. When the Roses begin to grow in the spring do not let them flower but pinch all the buds off as they come, and so strengthen the plants. By persevering in this way we have graceful clean plants full of healthful vigour in the time stated. Another way is to strike the cuttings in pots, so as to ensure transplanting without a check. Inserting feeble cuttings is almost certain to end in failure. The plan advised is so rapid in its results that we see that the plea of the trade growers that in grafting we gain time—the main use of the Brier—does not hold. With plants grown in this way also we at once get rid of the need for plastering the soil with manure every year—assuming that the ground is well prepared and dug to begin with. We also avoid the risk of frost, which so often destroys such Roses when grafted as standards or half-standards, because the root is protected in the ground and if the frost does cut the shoots down to the level they will still be quite safe. We also ensure a more graceful and vigorous growth, which is often absent when these things suffer on the Brier. The Tea Rose plants bought in the usual way are in some cases so weak that a good cutting cannot be got from them, and some perish wholly with me, as is the case with *Charles Rovelli.*

* * *

THE CALIFORNIAN PITCHER-PLANT (*Darlingtonia californica*).

Amongst the insect-trapping plants of the world none is more remarkable than the Darlingtonia, found beside streams and in marshy places at an elevation of 1,000 to 6,000 feet in the mountains of California. Being exposed at such a height to severe cold and heavy snow during winter, it is one of the hardiest of the larger pitcher-plants and so vigorous as to hold its own against great tufts of the Common Rush and other water-plants with which it is found growing. The plants grow in colonies, the rounded yellowish hoods which cover the mouths of the pitchers standing out in clusters with a peculiar effect, which has earned the name of "Calves' Heads" from the local mountaineers and has been compared by one traveller to bunches of mellow *Jargonelle* pears set on end at the waterside. Another quaint fancy is expressed in the common English name of Cobra-Plant, the domed top of the pitcher with its strange appendage suggesting the raised head of the hooded cobra with its open fangs. The wild pitchers are rather smaller than the finest of those grown under glass, varying from 18 to 30 inches high with hoods 2 to 4 inches across; on the other hand they are far more brightly mottled with red and yellow, cultivated plants losing in colour what they gain in size.



A Fine Pot-grown Darlingtonia.

The plant is wonderfully adapted to its end in life. Its hooded leaves, gathered in erect tufts, are much inflated towards the top and finely coloured or netted with green and red on a paler ground. Instead of the rounded undulating lid of other pitcher-plants, there is a red and yellow flap divided like a fish-tail, which hangs down in front of the mouth and conceals the flesh-coloured rim of the pitcher with its smooth and slippery sides. This fish-tail and the rims of the pitcher secrete a sort of honey, which is often prolonged as a sweet trail along a narrow wing or rib, running up the front of the pitcher from the rootstock to the mouth. Creeping insects are thus guided and lured upwards into the trap, while the notice of flies is doubtless gained by the gay mottlings of the pitcher and the sweetened trail conducts them also to the rim, where danger begins and the honey is most plentiful. The leaf-tubes are not erect as in most Sarracenias but are twisted spirally about half a turn or so in their entire length, leading straight into the mouths of the pitchers which face downward and in various directions: every device therefore leads to the same end. Once beneath the hood—and it may be partially intoxicated—the insect forgets the darkened trap-door by which it entered, and passes upwards into the dome, composed of glistening translucent membrane through which the light strikes in richly chequered tints with all the brilliance of a stained window. So far from leading outwards however, this deceptive brightness covers the black depths of the pitcher, the walls of which, at first smooth, lower down are covered more and more thickly with needle-like hairs all pointing downwards and these unfailingly conduct the victim to the fatal liquid at the base of the pitcher and make return impossible. Old pitchers are often more than half-full of dead insects, tainting the air and ever attracting fresh victims to whom carrion is as welcome as honey. Beside flies—which form the largest proportion—bees, hornets, butterflies, dragonflies, beetles, grasshoppers, and even snails, are entrapped, while so unfailing is the attraction that the colonists use cut pitchers as ready-made flycatchers in their houses. The flowers of the Darlingtonia come singly, nodding at the end of long stems covered with straw-coloured scales or bracts. They are like those of Sarracenia but smaller in their parts, 2 inches across, pale purple in colour, with the stigma shaped like a five-pointed star.

Culture.—The Darlingtonia is not difficult to grow in a moist half-shaded house or pit secure from frost. Coming from such an elevation it enjoys a cooler temperature than the lowland Sarracenias and is killed by too much heat, while if grown in full sunshine it becomes stunted and subject to thrips, red-spider and green-fly. The compost should be of lumpy fibrous peat and live chopped sphagnum, with a little coarse sand and lumps of limestone or charcoal, but no loam or leaf-soil. The pots or pans should be filled one-third with crocks, allowing free drainage while the plant should be well raised as on a little mound. Constant moisture at the root and in the atmosphere must be maintained by a free use of the spraying-can or syringe, but care should be taken that the water does not enter the pitchers or they may be broken down by its weight. Some growers keep the plants in a saucer of water throughout the summer, but a better way is to sink the pot in a second and larger one where it is well padded with sphagnum, or even (when the plant has to be grown in a house with other things) to give it a ventilated glass case in its own corner, where it can more easily be kept moist. Plants may be increased by division or by seed, which is freely produced and germinates without much difficulty. The best plants are raised in this way in pans nearly filled with the same compost covered over with a neat layer of fine moss upon which the seed is sown, covered with glass, and stood on a shelf in a cool house or in a cold frame. The seedlings appear in a month or six weeks and when of a size to handle may be pricked off in similar pans and potted off in their second season, though four or five years elapse before they reach flowering size. Plants may be divided at any time when at rest, the crowns being severed by a sharp knife, though not infrequently there are strong offsets almost like runners which can easily be removed and soon make large plants. This work and potting must always be done in the resting season—generally July—for the plant suffers greatly from disturbance at other times, and the roots are often active before there is any appearance of growth.

The plant shown in our engraving was perhaps the finest ever grown in this country, with several pitchers over 3 feet in height (the tallest 3 feet 9 inches) with hoods measuring 4 to 6 inches across. Very fine plants have also been grown at Glasnevin and in the gardens of the Earl of Pembroke at Mt. Merrion, where there was a tuft over 3 feet high with as many as 40 perfect pitchers. Though mostly seen in a greenhouse it is possible to grow the Darlingtonia quite successfully in a shady cold-frame or even in the open air. This experiment has been tried in many places with more or less success, any failure being due rather to our short cool summer than from any fear of cold. In any case the growth is somewhat slow and the pitchers are small though they colour well. The best chance of success in this way is to raise hardy seedlings in a cold frame and plant them in a very sheltered place beside water when about four years old, protection being given by a handlight from cold dry winds in spring.

VARIETIES.—A so-called new species of Darlingtonia was found on Black Hawk Creek in Sierra County, California, in 1878, and was figured in colour in the *Californian Horticulturist* for January 1879, where its flower-scapes are described as being 40 inches in height. There is also a distinct form known as *Darlingtonia rubra*, in which the pitchers are slighter and less robust and more or less suffused with crimson. The Darlingtonia has resisted all attempts at crossing with Sarracenia, but what is either a distinct seedling form, or a cross with a Nepenthes, was sent out some years ago by Messrs. Veitch of Chelsea and named *D. Courtii* after its raiser, William Court. In this plant the pitchers are shorter, stouter, and more rounded at the mouth, with the footstalks starting flatly outwards from the crown and developing erect pitchers almost at right-angles. It needs more warmth than the wild plant, growing well with Masdevallias and suspended like a Nepenthes.

NEW LUPINS.—From the nurseries at Daisy Hill, Newry, comes a choice selection of named kinds raised by Mr. T. Smith, remarkable for their range of colour and very effective as seen in bold groups. Amongst the most distinct of these seedlings are *Golden Spire*, with dense spikes of fine clear yellow ; *rubra aurea* with flowers of pale yellow, deepening in the standard and taking a shade of reddish-purple with full expansion ; *Blush Queen*, with dainty spikes of pale mauve flowers shading to a deeper tint upon the standard, and with bright blue pencillings on the keel. In this kind the buds are white, giving a pretty contrast of colour. *Butterfly* is a creamy-yellow kind with deep blue lines on the keel and rosy-lilac shading in the standard. *Bridesmaid* is creamy-white with rosy-lilac touches towards the outer edges of the petals ; and *alba elongata* has long spikes of white flowers turning to pale yellow on the erect petals. *T. Smith* is a fine dark flower in very long spikes of bright blue, shaded with rosy-purple on the standard and with deep reddish-purple stems showing through the flowers. *Rubescens* has large flowers of rosy-purple, with deep blue pencillings on the keel and a blue spot at the base of the standard. In *May Day* are large wide-open flowers with a bright blue keel, standard shaded blue with a bright blue spot at the base. *Sprite* has short rounded spikes in which white, pale-yellow, blue, and rosy-lilac, are all present. Another good dark kind is *Daisy Hill* in deep blue and purple, with enough white for effective contrast. *Bronze King* is very distinct, with its flowers in clusters and deep yellow, suffused with dull bronze-purple and blue pencillings. In *Glowworm*, at first dull yellow, the flowers are gradually suffused with reddish-purple until the standard is quite deep in colour. *Beauty* bears dense spikes of rather small bright blue flowers, set off by white edges and a rosy-purple standard; while in *May Queen* the flowers are sparsely-clustered with almost a whorled effect, their colour being blue and creamy-white in pretty combination. Grown in large masses as at Newry, there are few finer June-flowering plants for banks and dry places, and this strain supplies the best colour-combinations we have yet seen.

HOLBOELLIA AND STAUNTONIA.

The Holboellia is rarely seen save in gardens along the south and west coasts of Britain and especially in Devon and Cornwall, being too tender to thrive in the open air anywhere far inland and passed over for other things that are more showy when it is a question of furnishing a glass-house. And yet the plant is far from unattractive when correctly used and well cared for. From the mountain forests of northern India, at elevations of 4,000 to 9,000 feet, it is a climbing plant of strong growth when well established, with fine foliage of a pale green and flowers that are strongly fragrant though inconspicuous. In the size and shape of the leaves there is much variation, some forms bearing only three broadly-oval leaflets to each leaf, and others any number up to seven or nine narrow ones. The colour of the flowers also varies from greenish to nearly white or a dull reddish-purple, these differences seeming to depend somewhat upon elevation with its changes of climate, and the age and vigour of the plant. Well rooted plants throw strong shoots of 12 to 15 feet in a season, which with age develop into woody stems several inches in diameter. In its own country they bear fruit in the form of large egg-shaped or oblong pods of 3 to 5 inches, reddish-purple in colour and filled with a soft pulp when ripe, which, though somewhat insipid to European taste, is freely eaten by the natives of Nepaul.

The Holboellia flowered for the first time in this country about fifty years ago, at Sketty Hall near Swansea, where it was grown on a south wall. As a rule an east or west wall is better than one facing south, for hot sun will turn the foliage yellow. The flowers come as clusters from the leaf-axils and very freely during March and April, scenting the air all around; the true petals are very small, the six sepals taking their place in the flower which is green or purple according to sex. For the sexes are apart in the Holboellia and though flowers of both kinds are often produced, it sometimes happens that only one sex may be represented for several seasons in succession. In a few favoured spots—as against the walls of Battle Abbey—the plant fruits pretty freely, but in most places this occurs only with old plants and at long intervals. The fruits ripen late in the year and are not infrequently overlooked until laid bare by the falling leaves in November and December. They are fine in colour and would perhaps be produced more freely if a little trouble was taken to fertilise the female flowers by artificial means.

In colder districts away from the sea the Holboellia needs protection in winter, and is most suited to large houses where its rambling shoots will quickly cover a wide space. If in too warm a temperature it grows fast without flowering, indeed in a cool house or glass-covered corridor it is far more likely to do well, and even a few degrees of frost now and then will do no harm. The graceful shoots with their glossy divided leaves are pretty for cutting to mix with flowers, and being evergreen their verdure is welcome during winter. Cuttings of the half-ripe shoots will root in gentle heat but not readily, and where seed is available this is a surer means of increase. A dry sandy soil is unsuited to the Holboellia and light soils should be enriched by humus and well-rotted manure and kept constantly moist in the growing season. A starved plant betrays its weakness by the sickly yellow of its foliage, but no plant responds more quickly to feeding and the deep green colour returns as though by magic. Several years will often elapse after planting before the roots lay hold of the soil, but once well established no plant is easier to grow. Two or three named forms exist, distinguished mainly by the shape of their leaves; thus *latifolia* has three to five broad leaflets, *angustifolia* seven to nine narrow leaflets, and *acuminata* abruptly pointed leaves and deeper purple flowers.

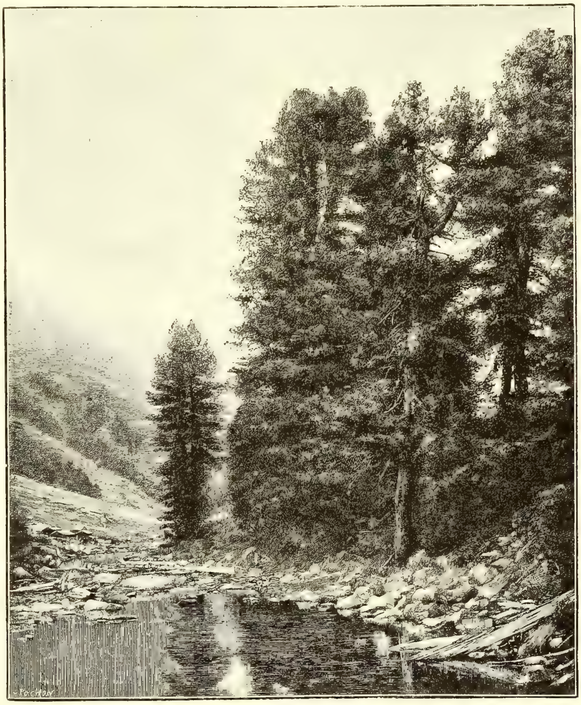
Closely allied to Holboellia is Stauntonia (indeed Holboellia is often known as *Stauntonia latifolia*) which is also an evergreen twining shrub thriving on sheltered walls in the warmer parts of the country, with protection from severe cold. The leaves are prettily cut into leaflets of deep green, and the flowers, borne during summer are greenish-white and almost identical in shape and structure but not so fragrant as in Holboellia and gathered in smaller clusters. The fruit, as seen on a plant which fruited recently at Torquay, is also exactly like that of the Indian plant. Stauntonia is a native of China and Japan and fully as vigorous as the Holboellia, old stems of 40 feet or more being not uncommon in the East. B.

A New Hardy Orange.—A recent issue of the *Revue Horticole* tells of another advance towards the hardy edible Orange, this time from Montauban, where a French gentleman has been working to this end. Some years ago he crossed a fine Sweet Orange tree with the pollen of *Citrus trifoliata*—the Hardy Orange of which we gave an account upon page 65 of the present volume of Flora. The seedlings proved variable, some bearing divided leaves as in the pollen parent, and others broad simple leaves more like the Common Orange but with winged stems, and all more or less armed with reddish spines upon the branches and at the base of the leaves. One of these plants which fruited bore fragrant flowers like those of *C. trifoliata* but narrower in petal, and finely coloured fruits considerably larger than in that kind, in which, though still very thick, the skin is of finer texture and the pulp has gained in quantity if not in quality. As proof of the resistance of this new race several plants have endured upwards of 20° of frost without injury to leaf or fruit. The degree of hardiness diminishes as the form approximates to the mother-plant, until those that come nearest the Sweet Orange show signs of delicacy or have perished outright.

Apart from their economic interest these results prove the near relation of the Hardy Chinese Orange to the cultivated forms, and the folly of those who try to put it in a class by itself, for in addition to the ease with which the cross was brought about, so far from being sterile as are all generic hybrids, these seedlings yield their own seed so freely as to prove the close relationship of the parents.

A GROUP OF THE SWISS PINE (*P. Cembra*).

We have often spoken of the gain in effect and in growth of grouping the hardy Pines of the world in picturesque and natural ways rather than on the "specimen" system, which makes them branch out too much and never shows their true forest character. Owing to the persistent planting of Pines in this way it is difficult to get from our pleasure-gardens illustrations of the natural grouping that we would fain see. We have therefore the greater pleasure in showing a natural group of the Swiss Pine, engraved for Flora from a photograph sent to us by M. Henry Correvon of Geneva. As this great tree is fully described in vol. I p. 97 of Flora and Sylva, we need not refer to it here further than by stating that it is best fitted for poor and cold upland ground, of which there is so much in our islands.


The Swiss Pine at Home (*Engraved for* "*Flora.*")

RICHARDIA: WITH COLOURED PLATE OF A NEW HYBRID (*R. cantabrigiensis*).*

The New Hybrids. For three years past I have flowered a charming pair of hybrids to which has been given the name *Richardia cantabrigiensis*. I speak of them as a pair, for though identical the cross has been made both ways between *R. Rehmanni* and *R. melanoleuca*. In these charming plants the pink colour of *R. Rehmanni* is clearly seen, slightly on the inside of the spathe and more deeply on the outside, and this is an important point because of the great gain it would be if a good pink or red spathe could be produced. Some progress has already been made in these hybrids, for the pink suffusion appears under ordinary conditions whereas in *R. Rehmanni* it only appears under strong sunlight. Apart from the flushing of pink the spathes are ivory-white, but as in *R. melanoleuca* there is a fine dark eye. This dark eye is a dominant feature common to all the crosses though it does not belong to *R. Rehmanni*. The leaves are intermediate in character though the stalks have little or nothing of the hairiness of *melanoleuca*. The spathes may be described as half-open, and this, combined with their small size, gives a more refined effect than those that are larger and more widely spread. Cut, they made an exceedingly pretty display arranged with foliage in a silver vase in the Queen's Room at the Fitzwilliam Museum last year, when the new buildings were opened by the King.

R. IRWIN LYNCH.

Cambridge Botanic Garden.

The Richardias. For many years prior to the opening up of South Africa, the Richardias were a little group of four or five sorts found near the coast, of which only the White Arum (*R. africana*) was of importance, the other kinds being scarce or of no great beauty. But in 1889 Elliott's Golden Arum was raised from seeds sent from South Africa, and the sensation of this gain had not subsided when, at Pentland House, Lee, a second new and richly-coloured Richardii (*R. Pentlandi*) appeared, followed in rapid succession by one new kind after another, until the group now consists of twelve or more species and a number of crosses and garden varieties. These new kinds are varied in colour of spathe, but by far the greater number are in shades of yellow, from the palest cream and sulphur, through ochreous and greenish shades, to the richest yellow verging upon orange; in fact, the choice of yellow kinds and varieties has become almost embarrassing. From the failure of the Pink Arum (*R. Rehmanni*) to colour in our gardens, we are still without the Red Arum of so many dreams, though it is hoped, by crossing, to secure something in the way of a rosy or pink spathe.

As to Name. Though known botanically as Richardias—in honour of Richard, an eminent botanist early in the last century—these plants are mostly known by English names, of which there are several for the White Richardia, though few plants have been so unfortunate in the choice. The name "White Arum Lily" is firmly established by usage, spite of the fact that

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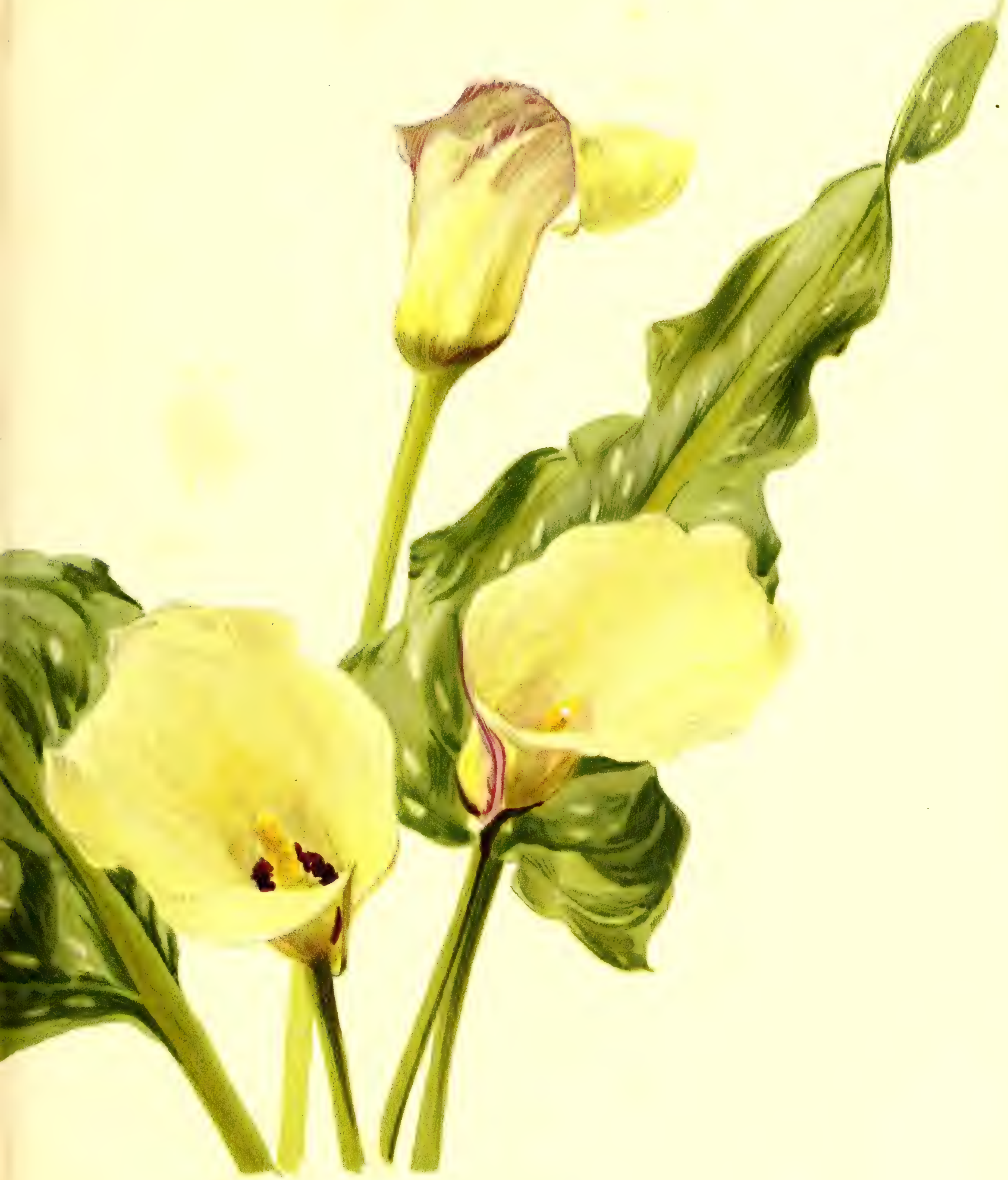
* From a drawing by H. G. Moon in the Cambridge Botanic Garden.



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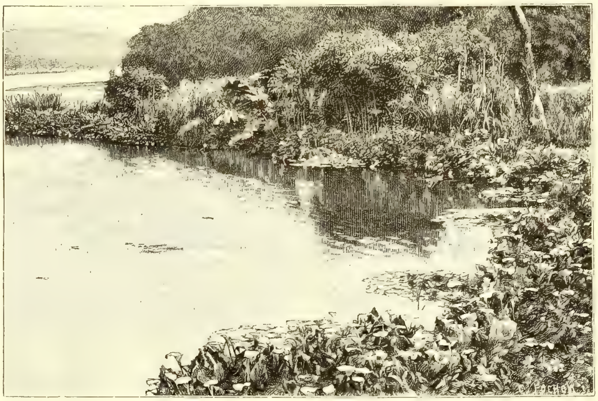
the plant is botanically apart from the Arums, and is certainly not a Lily. The name *Calla*, once commonly applied to it, is yet worse, as belonging of right to plants widely severed from this tender South African group; while the title "White Lily of the Nile" (proper to the Lotus) is falsely used for the White Arum, which is unknown as a wild plant within the Nile region. But, spite of the fumings of botanists, the names White and Yellow Arum are likely to survive in common usage. All the kinds are from South Africa, but the newer sorts come from far inland, where the climate differs from that of the southern and coast region; their treatment under glass is, therefore, not quite the same as for the older kinds, more heat in growth and a time of rest between the seasons being needed. From failing to recognise this fact, many growers were at first disappointed with the Golden Richardias, but, as their needs have become better known, their value and brilliance during spring and early summer are beyond doubt. Most of the plants are readily increased from suckers taken in spring, or, where it is to be had, from seed, which is the best means of increase. All the Richardias need a rich soil and abundant moisture during growth, with heat, or at least shelter from cold.

Beauty and Uses. As a group, the Richardias possess rare beauty of form, such as appeals even to those most untrained in things of art. Fine as is the shape and pose of the Acanthus, famed in Grecian sculpture, one is tempted to conceive how the genius of classic art would have immortalised the shapely lines of the Richardia, with its arrow-headed leaves presenting a succession of the most graceful curves from base to tip, the early bud folded in an exquisite spiral, and the perfect purity of the open spathe, combining something very near the perfection of grace incarnate. Grown in pots and under glass—the worst of all ways for beauty—this grace is still conspicuous; but to realise to the full its stateliness and charm, one must see it at the waterside as in Nature, thronging the margin of a quiet pool in crowded thousands, or, where the flow is stronger, scattered along the course in picturesque disorder, just as the floating seeds have run aground. Whether it be in isolated tufts, with the old leaves dipping lower and lower, still in a graceful bend, till they touch the water and sink to prepare



Fringe of White Richardias at the Waterside.

the way for the maturing seed; or where the great white spathes are thrust into the sunlight by scores and hundreds together, shining in twilight or in deeply-shaded nooks with an almost luminous brightness, in which the great moths hover; and last, as their beauty fades to the final scene, great heads of seed gather and swell, until even the stout stem can bear no more and the crowded mass is buried in the mud prepared by rotted leaves, to form another colony beside the parent, or to be scattered here and there at random by the flowing water: to see the Arum thus is to realise something of its value as an aid to beauty. Though common enough in the south of Europe, or in Madeira, where the Giant White Arum, tall as a man, grows in such profusion as to form the food of swine, such a scene is all too rare in Britain, and is confined to the warmest districts and most sheltered gardens. Still, it is certain that far more might be done to its free enjoyment in ways we shall suggest, and there seems to be no reason (save their scarcity) why some of the handsome yellow kinds should not be finely used in many a sheltered garden. In the warmer States of America, and in Europe—even to Germany—yellow kinds are flowered freely in the borders, and their roots stored dry in winter, their beauty being thus brought within the reach of many to whom their enjoyment as hothouse plants is impossible. As they become more plentiful, we shall doubtless hear of their use in this way (at least as an experiment) in English gardens.

Disease. Within recent years the Richardia has contracted "soft-rot," a disease which attacks the plants when about to flower. It is characterised by a slimy decay of the root and stems near the ground level, the plant sometimes falling over almost without warning and at others failing by slow stages in which the leaves turn spotted and the flowers brown and shrivelled. From study of this pest in America (where the plants are often grown in vast masses) it has been proved to be the work of bacteria, destructive not only to the Richardia but to many choice vegetables, and it is therefore important to destroy all diseased plants lest they should infect other crops. The disease is readily detected in growing plants by the soft watery tissue and brown flesh of the tubers which should be firm and white; in dormant roots it is less easy to recognise, occurring as dry darker patches on the surface which often lie dormant for months if deprived of conditions favourable to activity. The best defence is air and bright sunlight—which destroys the germs in a few minutes; plants grown thickly in a dull light always suffer most. Growing them well apart in full sunlight, with free ventilation and some roasting of the corms during summer, appears to be the surest way of avoiding disease.

The following kinds are now in cultivation:—

R. Adlami.—A plant of minor interest for gardens, though distinct and of great vigour. It was sent out by M. Max Leichtlin of Baden in 1898, and differs little from others of the family, save its white spathes, which are short and widely open, with a large blotch of violet-purple at the base, and carried upon stems a little shorter than the leaves. Though not so pretty a plant as the White Arum, it is interesting, as unlike any other kind, and its good constitution is of value for crossing. Crosses have already been raised between this plant and R. *Elliottiana*.

Richardia africana.—An old plant in gardens, and one of the most useful of white flowers, which with care may be had in beauty at almost any season. Perhaps few points of culture have been more debated than the summer treatment of this plant; but while it varies in detail with the end desired, it is now generally understood, vast quantities being grown for the trade and in private gardens. With rich feeding, few plants are more easily grown into specimens for decoration; but, although in masses it is fine in leaf, it is less free in flower, and if overfed the plant often bears double or even triple spathes, which are worthless for beauty. For decoration, small or medium-sized blooms, with slender stems, are the most useful, and when other foliage is scarce, their leaves are bold and handsome. In the south of Ireland and the south-west of England the White Richardia often passes the winter in the open unharmed, when deep planted or under a fair depth of water; the margins of lakes and ponds are thus turned into broad sheets of vegetation, yielding in one case 10,000 blooms at a time, and upwards of 50,000 in a season. In mild years the flowers are borne throughout the winter, and even when cut by frost the hurt is soon repaired, their roots being uninjured when at a depth of 2 feet. Though such results are impossible in many places, there are parts of the south and west in which use might be made of spare plants of the White Arum in this way, and its beauty as a waterside plant enjoyed in mild seasons; and if from time to time they perished in severe years, the loss would be easily repaired.

VARIETIES.—The White Arum comes freely from seeds, produced in heavy yellow masses, which in the south of Europe germinate freely around the parent, and are fast naturalising the plant; even as far north as around Cherbourg and other points in the north-west of France, stray plants of the White Arum are common in streams and watercourses. As a rule, these seedlings differ but little, and though a few distinct varieties are grown, many of the so-called forms differ no more in essentials than is often seen in the same plant under different modes of treatment; of this class are such kinds as *candidissima*, *superba*, and *elegans*. A distinct, large-flowered variety, known variously as *gigantea*, *grandiflora*, and *maxima*, has for many years existed in Madeira, where it reaches great size and profusion; its stems often exceed 5 feet, bearing immense white spathes of 8 to 12 inches across. Fine flowers (probably of this strain) were exhibited last summer in Germany, equalling these measurements even as pot-plants. More generally useful, however, are some of the dwarf varieties, of which *Little Gem* and *Perle de Stuttgart* are the best known. The first is now not much grown, for though its flowers are a pretty miniature of the parent, they are not freely produced, the strength of the plant running to a mass of offsets; if richly fed, these are less troublesome, but the flower comes bigger then and loses its distinct character. In *Perle de Stuttgart* there is more freedom, and its habit is good, though the flowers come much nearer normal size, resembling in this respect the older kind, *compacta nana*. Among the newer named sorts are *Childsiana*, of strong dwarf habit, with very large leaves and distinct flat-shaped spathes of great size, their defect being that when viewed from in front the tip recurves so abruptly that they look as though cut bluntly across; *The Godfrey*, a very dwarf plant of neat habit with abundant flowers of great purity and not too large; *Devoniensis*, of medium height, with very pure and shapely spathes, strongly fragrant; and *Nicolai*, a giant form shown in Belgium, with spathes 13 inches long and 9 inches broad upon stately plants of nearly 6 feet high. There is also a weakly variegated form, and other abnormal plants in which the whiteness of the spathe extends in some measure to the leaves.

R. *albo-maculata.*—An old garden plant, graceful and enduring, easy to flower in almost any garden during summer, and the ripened tubers may be lifted and stored like potatoes in winter. It is of small growth (often not reaching 18 inches), with bright green leaves upon short stems, and covered with oblong whitish blotches. The creamy or greenish-white flowers coming towards the end of summer, are smaller and less open than in the White Arum, with a blotch of deep reddish-purple at the base; though very freely produced, they are poor in colour, and apt to come deformed as a green and white blend of flower and leaf. Though sometimes grown for the sake of its fine leaves and ease of growth in almost any spot, as a flowering plant its value is small; and, indeed, the spathes are often cut without opening where rich foliage is sought. In mild districts its roots pass the winter in the open, with only a covering from frost; it may also be grown as an aquatic. Plants raised from seeds are the best for effect. A distinct variety known as *sulphurea* is better in colour than the parent, the dingy white being replaced by a spathe of soft sulphur yellow, contrasted with deep black at the base.

R. aurata.—A supposed cross raised by Messrs. Deleuil of Hyères between *Rs. hastata* and *albo-maculata*, but better classed as a form of the first named. It is a robust plant of free growth, thriving in the open from June to September, and of fine appearance with its bold leaves marked with transparent white dots like those of *albo-maculata*, but smaller and less numerous. Though akin to Elliott's Golden Arum in habit and form of spathe, they are smaller and of a soft ochreous yellow colour, with a blackish-purple blotch at the base, and do not compare with that kind in depth of colour; none the less, their size and good habit, and the easy culture of the plant, give it a distinct value in gardens, and it has been much used in crossing. Messrs. Deleuil offer, under the name of *R. sagittifolia*, what is another form of *aurata*, identical in flowers, but not spotted upon the leaf.

R. cantabrigiensis.—A new cross between *Rs. Rehmanni* and *melanoleuca*, raised by Mr. Lynch of the Cambridge Botanic Garden, where it has recently flowered. Its great merit lies in the fact that the rosy-purple colour of the wild form of *R. Rehmanni* (which disappears under our northern skies) is here regained in part, as a delicate pink flush suffuses spathes of ivory whiteness; this pretty flushing, deeper upon the outside than within, being produced under conditions which fail to develop the faintest colour in its parent. The new plant is, therefore, of value as an advance towards the Rosy Arum. In leaf and habit its character is intermediate; the leaf-stalks show the ruddy tinge of *R. melanoleuca* without its hairiness of stem, and the flowers resemble this kind in size, and in the fine dark blotch or "eye" at the base, which is wanting in the spathes of *R. Rehmanni.*

R. Elliottiana.—The first of the Yellow Arums, raised from seed imported from South Africa in 1886, and flowered in the gardens of Captain Elliott of Farnborough Park, Hants, three years later. As a golden counterpart of the White Arum, its appearance created such a sensation that the earliest plants reached a high value, and it is still a scarce plant in gardens. It differs from *R. Pentlandii* in its spathes of uniform golden or orange yellow, with no dark blotch at the base of the tube, and no smell; the leaves also are thinner in texture, and covered upon blade and stem with whitish transparent blotches. The plant is beautiful and vigorous, flowering freely during summer, the spathes lasting long in beauty, and fading gradually to greenish-yellow with the formation of seed. This is freely produced and the best means of increase, though the plant may also be grown from offsets, which bloom during their second season. Like *Pentlandii*, it succeeds in a warmer temperature than the common Arum, but when at rest may be stored in comparatively cool quarters, coming as it does from an inland but elevated part of South Africa, where a hot summer is followed by a season of cold. The root-tubers are flat and fleshy, reaching considerable size in old plants, and drying when at rest. After re-potting in spring, they are best in a cool house at the outset, until the roots have gained hold; but when placed in heat they grow very quickly (more so than *Pentlandii*), flowering in three months or even less. The plants need careful tending until the seed matures—towards the end of summer—and should then be ripened off and stored away in their pots for the winter. The seed germinates quickly, and should be thinly sown and grow unmoved during the first season, pricking off being often attended with loss. Though their culture in the open during summer does not appear to have been tried in this country, it has given such good results in America, Germany, and the south of Europe, that there seems little doubt but that (at least in the warmer parts) it would be equally successful in Britain. Plants reserved for seeding must, however, be started early and flowered under glass if the seed is to ripen thoroughly before autumn. Culture in the open is described as like that of any potato, the roots being planted in spring and allowed to grow and flower freely until cut down by the early frosts of autumn.

VARIETIES AND CROSSES.—A fine variety named *R. E. Rossi*, after its introducer, Mr. Donald Ross of Capetown, is distinct and yet finer than the original plant. It is of somewhat dwarfer habit, with shorter stalks and smaller leaves more thickly spotted; its spathes are of a softer canary yellow, with a blotch of purple in the tube, and its roots yield offsets with greater freedom. From the advance already made by seedlings there seems reason to expect further improvement in cultivated forms of *R. Elliottiana*. Several crosses between this and other species have already flowered, the most important being a cross with *R. albo-maculata*, raised by Mr. Latham (late of the Birmingham Botanical Gardens) and flowered in 1903; it is a fine plant, bearing spathes of pale sulphur yellow with a crimson blotch at the base and leaves freely spotted like those of the parents. Repeated in America this cross has produced *R. Mrs. Theo. Roosevelt*, which, though apparently identical with the Birmingham plant, has attracted wider notice and been freely propagated. It is very prolific, nearly hardy, and comes true from seed. A third plant very near these is *R. Taylori* sent out by Messrs. Clibran as a cross between *Elliottiana* and *aurata*, and characterised by the same pale yellow spathe with a dark eye. A German seedling with much the same parentage is *R. Solfaterre*, which only differs from *Elliottiana* in its sulphur-yellow spathe with purple base. Other crosses have been raised between this kind and *R. Adlami* bearing spathes of creamy-white with a dark eye.

R. hastata.—A plant of wide distribution in various parts of South Africa, and long known though rare in gardens, having been first brought from Natal by Messrs. Veitch in 1857, and again introduced in slightly varying forms during recent years, from points much further north. It is of dwarf habit, rarely exceeding 2 feet in height, with leaves of dull green very like those of the White Arum, but with lobes pointed at the base and bearing a few hairs on the lower part of the leaf-stalk. In colour its flowers vary from creamy-white with a heavy blotch of crimson-purple to dull straw colour, or greenish-yellow, the green colour being deeper on the outside of the spathe and increasing as they fade. The spathes are beautifully folded from a broad base and cupped in form rather than trumpet-shaped, tapering to a short erect tip. It is a plant of easy culture, needing similar care to the White Arum and flowering during summer. The geographical form discovered of late years, and at the outset reported as distinct, under the names of *R. Lutwychei* and *Pride of the Congo*, is found to be so near this kind as to be hardly distinguishable when grown under similar conditions. By many botanists Deleuil's Yellow Arum (*R. aurata*) is also classed as a mere variety of this old plant.

R. melanoleuca.—A dwarf and distinct kind brought from Natal by Messrs. Bull in 1869. It is the smallest of the Yellow Arums, with spathes about 3 inches long and broad, of pale straw colour with a large black-purple throat, not folded, but widely open from the base, exposing the yellow spadix; margins and tips deeply recurved. These small, neat flowers, borne upon long light stems, are very pretty for cutting. The leaves are broad and fleshy, 6 to 12 inches long, with a few bristly hairs upon the reddish stems, and dark green blades sparsely covered with whitish spots. A plant of easy culture, flowering in summer. The plant known as *R. suffusa* is so near this as to be generally regarded as merely a robust form of it.

R. Nelsoni.—One of the last new kinds, from the interior of South Africa. It is akin to *R. albo-maculata*, but of very vigorous growth (at times exceeding 4 feet), with flowers overtopping the ample foliage of dark green, covered—as in so many kinds—with whitish, transparent spots. The pale yellow spathes bearing a large purple eye are much folded, and only expand slightly to a short blunt tip.

R. Pentlandii.—The largest and brightest in colour of the Yellow Arums, found in the mountains of Basutoland and the Orange Free State, and first flowered in 1892 in the garden of Pentland House, Lee. Of uncertain origin, these first plants aroused wide interest and much difference of opinion as to their relation to Elliott's Golden Arum, whose appearance was still fresh in mind; other tubers, however, found their way to Kew from a different source, leaving no further doubt of their specific rank. The plant is beautiful and vigorous, and the largest of any in leaf and flower. It is sturdy in habit, and the leaves are more pointed than in other kinds, and of a uniform dark green (save upon the stalks, which are much spotted with red), and thick and tough in texture. The trumpet-shaped flowers, very broad and of intense colour, are of rich golden-yellow within, somewhat paler without, with a blotch of purplish-black at the base of the spathe, which differs much as to size in different plants. The tubers are round and flat, and are found growing at a depth of 8 to 15 inches among the rocks and boulders of the mountain side, drying off completely during the hot season. Under cultivation, its needs are constant heat and moisture, with a regular season of rest after growth is matured; it cannot do with the cool treatment that suits the White Arum, and to this error in cultivation its early failure in many gardens was due. In parts of Europe with a hot summer, the Yellow Arums are easily flowered in the open from rested tubers planted in spring, but in Britain the practice is to pot the roots in February, and grow them in an intermediate house with constant heat until summer is well advanced, when, with a lower temperature and less water, they go gradually to rest. Though normally in beauty during early summer, it is possible to have it in flower at almost any season by changing its time of rest. The plants seed freely, this being the best means of increase. Syn. *R. angustiloba*.

VARIETIES.—A seedling variety with spathes of a pure sulphur-yellow colour has been raised. Other colour varieties found among the first imported roots flowered in the gardens of Lord Rothschild at Tring Park. Of these, *R. P. suffusa* is a dwarf plant of fine vigour and habit, bearing spathes of creamy-white suffused with rich violet-purple towards the base; while the second kind, known as the *Tring Park variety*, has spathes of deep gold approaching orange, with the same dark eye within, and a few translucent leaf blotches after the manner of *R. Elliottiana*. Other plants, with more or less of these white leaf-marks, have been distinguished as *R. Pentlandii maculata*.

R. Rehmanni.—A plant discovered by Rehmann in Natal, and unlike any other kind in its rounded Canna-like leaves and the colour of its spathes. Under the powerful African sun these are of dull rose, shading to rosy-purple within, but to the disappointment of growers this deep colour is not seen in Europe, a faint rosy flush upon the outside and the edges being the only traces of its latent presence, while often the flowers of creamy-white are devoid of even this colour. The spathes are small and neat, very like those of the White Arum in shape, but only 4 inches long with a narrow tip; the leaves exceed the flower-stems, and are spotted with long, narrow streaks of white running parallel with the veins. It is hoped by crossing to regain the rosy colour of the wild plant lost under cultivation, and the measure of success already attained is shown in Mr. Lynch's new hybrid. A strong form of this species is offered as *robusta*, but though of good habit the spathes still show no trace of colour.

R. Sprengeri.—A new and rare plant from Griqualand and the Transvaal, first flowered by Sprenger of Naples in 1900. It belongs to the group of Yellow Arums, now so numerous, and at its best is equal to any in size and rich colour, while it differs from all in its form of leaf and the wide funnel shape of its open spathes, which are broader than in any other species. The leaves are about 9 inches long and one-third as wide, with conspicuous veins and numerous white dots, while occasionally they are variegated with white in addition. The spathes vary in colour from rich, clear yellow to sulphur and creamy-white, and are freely produced in the open during the southern summer. B.

THE GREATER TREES OF THE NORTHERN FOREST.—No. 30. THE RED CEDAR (*Juniperus virginiana*).

THERE have been many failures in the introduction of trees of the Pine tribe into our country, and the way most fail is in hardiness or in starting in our "open" winters, before they would do so naturally in their native countries. The greatest test of all is that of hardiness and vigour, and in this tree we have one that meets it fully, and is of the easiest culture. Whether we plant it on the fringe of a marsh, on a limestone hill, or even in a peat bog, it is happy anywhere save in cold clay or hot sand, and never shows any of that disfigurement after harsh spring winds seen in some of the Californian and Mexican trees. Its beauty is remarkable; it may give us an effect something like that of the Eastern Cypress, where, as in so much of our country, there is no chance for that to thrive. It is one of the best seaside trees, resisting the full force of the Atlantic winds on the eastern shores of North America, and reaching its finest development near salt water.

Introduced by Evelyn in 1664, this has now long been a neglected tree, and the scanty notice given to it in works of reference is surprising. Yet there is much to be said of its perfect hardiness, its beauty, and the distinct effect of its reddish-brown or purplish foliage in winter, enhanced at times by the clusters of purplish-white fruits upon the female, though these are less often seen with us than in America. Flowers of both sexes sometimes occur on the same tree, but they are mostly apart and to enjoy this effect of fruit the sexes must be planted together and seedlings secured from trees selected for their beauty in this way. In a young state the tree is tapering, with its branches rising close to the stem, but slowly its outline broadens until with age the mature tree becomes round-topped and irregular. The colder and more northern the situation the more compact and closely pyramidal is the habit. There are a few avenues of Red Cedar in the country—as at Fornham near Bury St. Edmunds—but the irregular growth even in carefully selected seedlings is against its wide use in this way.

But we mostly put the Red Cedar in the isolated way in which conifers are planted in this country, so that it is beaten about by every storm and starved by the grass around. The better way to treat it in order to get its fullest expression as a tree, would be to plant it young and closely among Larch or other upright forest trees, which would grow up with it into its true forest character. Owing to our ways of planting it we rarely regard it as a forest tree of 70 to 100 feet, which it really is as will be seen from the following note of the Red Cedar in its own land sent us by Mrs. Dandridge from West Virginia. Fewer still among us know of its high commercial value, which has led to its trial as a timber tree in France and Germany.

In its own Land. This tree is not a true Cedar, nor do I know why it was ever called so, though this is the name everywhere given to it in the United States where it has a wider range than any other evergreen tree. It is a valuable tree with a maximum height of 100 feet and a bole diameter of 5 feet, and yet it usually passes as a tree of secondary size. Scattered throughout a large area of our country, it is found in great abundance in Tennessee, Alabama, and Florida, and reaches its finest development in the forests of the Red River Valley, Texas and Indian Territory. In this (the eastern) part of West Virginia, it is the commonest of trees and indeed the only native evergreen, and perhaps no other tree varies so much as to size, form, colour of foliage, and general appearance. In the north it is usually found on cold dry uplands; in the middle States on stiff clay soils bordering pasture-lands or on ridges left by the farmer where the soil is too rocky for tillage; it also forms much of the undergrowth in our woods. For the Red Cedar will live in the shade of other trees, in clefts of the rock on steep mountain sides, or in the swamps of Florida which are covered with water much of the year. Again whereas in fertile valleys of the south and middle States it is a broad-topped and dignified tree, on the limestone hills of this neighbourhood it becomes a meagre evergreen with sparse foliage, and upon the dry ridges still further north it is little more than a shrub and often nearly prostrate. This variety of form shows an adaptability to surroundings enabling it to live almost anywhere over an immense tract of country, even upon the sea-shore and within reach of the salt spray, provided the soil is not too poor and sandy.

In my experience its chief defect seems to be the sparse foliage, especially when trees are old or crowded. In the spring it recovers colour very slowly, for though the new growths are a lively green most of the leafage remains dull and dingy, thinly covering the rusty and rough-barked framework of trunk and limbs. But while this is true of old trees as found on poor and stony ground, young trees are often gracefully varied in outline and cheerful in colour, so that it is possible to make beautiful use of selected trees. In ornamental planting however, I have found that when past the beauty of youth old plants do not harmonise with evergreens of brighter colour, though often exceedingly picturesque in their own gaunt way. Nature knows well how to use this tree in her wildest haunts, and from her we learn that one of the best uses that can be made of the Red Cedar is as a background or foil to gayer flowering-trees and shrubs. In the spring our woodlands hereabouts are lighted up by the large-flowered Dogwood (*Cornus floridus*) with its clusters of snowy white blossoms mingled with the rich rosy-purple of the Red-Bud (*Cercis canadensis*). Thickets of these little trees are never so beautiful as when they stand against a background of rugged old Junipers with their rough bark and craggy limbs. Again, along our roadsides in the fall one passes group after group of them massed irregularly on the rocky slopes, some of them standing out spiry-topped against the sky-line, their trunks concealed and their branches mingled with trails of Virginia Creeper, turning blood-red in the autumn sunlight. Or yet again one pauses on a November day to note the charm of an old tree wreathed with Bittersweet (*Celastrus scandens*), hanging its clusters of bright orange and scarlet berries from the straggling limbs. These berries remain bright all winter and contrast charmingly with the blue berries of the female Juniper, which are a staple food of many of our winter birds.

In the grounds here the Red Cedar springs up everywhere and is especially effective as a mass around an old Ash tree crowning a ridge of limestone rock. In the spring these rocks are covered with moss and ferns, and masses of the red and yellow Columbine, that wild-flower gipsy which loves our wildest cliffs and is yet one of the most readily naturalised of native plants. In another place it makes a good backing for double Japanese Cherries, pink and white, which are richly beautiful in May against the dark screen of Juniper. Another tree we use here is the double-flowering Peach which has large rosy-red flowers before the foliage matures. This has for near neighbour a large old Cherry tree which furnishes the necessary contrast of green foliage upon the one side, while a group of Red Cedars further back throws up the brilliant colouring of the Peach with an effect almost startling.

Increase and Culture. The seeds of the Red Cedar germinate slowly, often showing no signs of life until the second year. A bulletin issued by the United States Forestry Division says that "as soon as ripe the seeds should be soaked for some time in hot water, and then mixed with sand and kept moist until the following year. They are best planted in the fall, twelve months after gathering, for though they will keep till the following spring they do not germinate so freely as when autumn-sown. Treated in this way the seeds sprout in a few weeks after sowing and the seedlings should be transplanted to about 5 inches apart in the spring of their second season. By the end of the second year they should be 7 or 8 inches high and well rooted, and it is best to transplant again in March or April of the third season to about 8 or 9 inches apart. When finally planted in the following spring the plants should be moved with a ball to 4 feet apart, and well watered after planting; they will then soon shade the ground and need no further care. It is a tree that moves well even to a considerable size, but, as with all forest trees, young seedlings give the best results. The young poles and saplings furnish material for fences, stakes, and hoops, yielding an income that goes far towards meeting expenses. At a diameter of 6 inches the tree furnishes excellent posts."

Under natural conditions, though germination may be slow it is sure. Here, in a grove of Oaks and other hardwood trees, the seedlings germinate freely under the shade of the deciduous trees, and grow to maturity with no care. Browsing cattle often injure young trees, but where the ground is protected they increase rapidly, reaching an average height of 16 feet in twelve years. The young trees vary so much in colour and habit that from a single batch of seedlings one can select varieties so unlike as to seem wholly different trees. The foliage also varies much even upon old trees and is frequently found in two stages upon the same branch; an early stage in which the leaves are narrowly pointed and prickly, and a later stage when they become scale-like and imbricated like those of a Cypress.

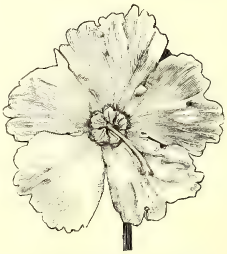
Varieties. Many varieties of this Juniper, some of which are pretty and graceful, have been selected for garden use. They are however little planted by Americans, who prefer the more uncommon evergreens. Some nurserymen offer the weeping variety and the Silvery Red Cedar (*glauca*); the Elegant Red Cedar is described as having golden-bronze foliage, and beside other variegated kinds there is a form called Schott's Red Cedar, which is pyramidal in habit, of very compact growth, and bright green in leaf.

Wood, etc. The demand for Red Cedar is fast outstripping the supply. Its sapwood is narrow and dingy-white in colour, and the heart-wood a dark brownish-pink or dull red. The wood is of an even, straight grain, light, soft, easily worked and yet very lasting. It takes a fine polish, has a pleasing fragrance, and is much used in the arts and industries, though the rapid taper of its trunk and the deep furrowed channels in the bark render the sawn planks short and narrow. Being very durable underground and in contact with water, poles, piles, and cross-ties are made of it in great quantities, also buckets, churns, and tubs, while it is used in Germany to make cigar-boxes. It also furnishes the wood for pencil-factories, and is used by cabinetmakers for Cedar-chests in which furs and woollens are stored, the smell of the wood banishing moth. The waste sawdust is made into paper for under-laying carpets, and a medicinal oil is distilled from the twigs, leaves, and wood refuse. Where other food is scarce in winter the leaves are given to sheep, which are said to thrive upon them even in the lambing season. The wood from Florida is considered the best and until lately more than three-fourths of the world's supply of pencil-wood was furnished by that state, but the mills have now almost exhausted the supply and have been obliged to move to the adjoining states.

References.—Evelyn's Silva, vol. 2, p. 11; Loudon, Arboretum, vol. 4, p. 2495; Veitch's Manual, p. 282; Cobbett, Woodlands, par. 167; Sargent, Manual of North American Trees, p. 94; Journal of the R.H.S., vol. 14, p. 298; Cannon, Semer et Planter, p. 241; Gordon, Pinetum, p. 154; Woods and Forests, several notes.

SHORTIA UNIFLORA.

This engraving of *Shortia uniflora* (one-third under life-size) is from a photograph taken last April by Mr. Ruddock of Alnwick, from a plant growing on my rock-garden at "Alnbank." Comparison with the coloured plate of *S. galacifolia* in the January issue of Flora, will show the distinct character of the two species. The rarity of the true *S. uniflora* and of illustrations of it, doubtless accounts for errors of description. During the present year this charming plant (like other things Japanese) has quite surpassed itself, producing sixty blush-

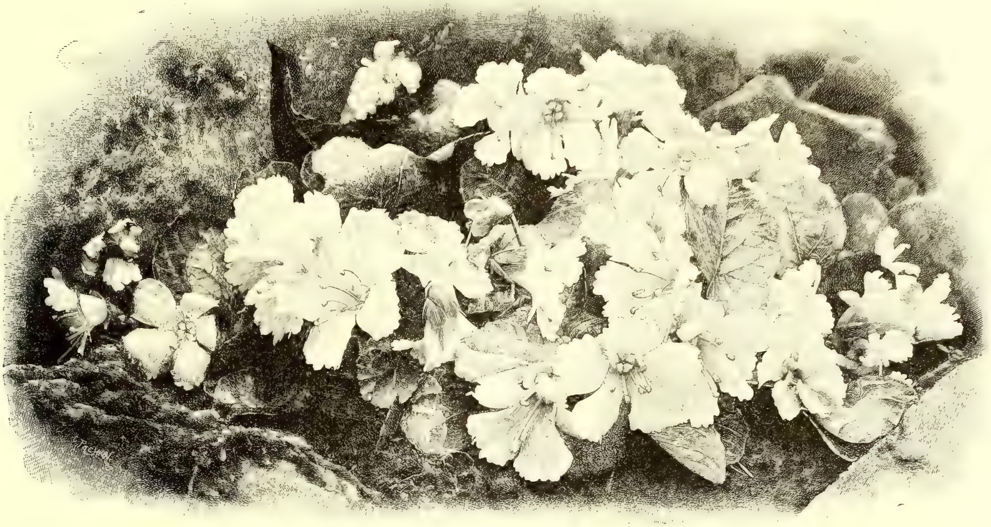


Flower (Full Size).

coloured blooms most of them $1\frac{5}{8}$ inches in diameter and more than double the size when first flowered here.

S. uniflora, a native of the Alps of northern and central Nippon, differs from the plant of North Carolina (*S. galacifolia*) chiefly in having larger blooms, more prostrate and somewhat broader leaves, with more prominent veins and shorter flower-stems; some of the flowers hardly rise above the foliage. I have had my two plants for about seven years and that shown in the engraving has always grown in peat in a southern exposure. It greatly exceeds in vigour the second plant, which, until recently, was on the northern slope of the rock-garden in peat and loam mixed, and annually produces a few bright rose flowers. The foliage of both is very brilliant in autumn, being richly veined and shaded from August till the following spring. I have not in any way protected my plants and they appear to delight in a rainy and inclement winter, which is not surprising when their native habitat is remembered. I have not as yet succeeded in raising seedlings, nor has the quality of the seed, up to the present given me much hope of doing so. W. T. HINDMARSH.

Alnbank, Alnwick.



SHORTIA UNIFLORA IN THE ROCK-GARDEN AT ALNBANK, ALNWICK (*Engraved for "Flora."*)

THE BROAD-LEAVED ROCKFOILS (*Megasea*).

THESE plants are among the hardiest, most easily grown and useful of evergreen perennials, and have very distinct and high value for the garden. Save for two or three tender kinds they thrive anywhere and are remarkable for their bold foliage, often richly coloured in autumn and winter, and for their finely coloured flowers. Their one fault is that these come so early as sometimes to suffer from late frosts, so that sheltered corners should be given when possible, and they are not averse to a little shade. For the best effect the strong-growing large-leaved kinds should be massed freely with other fine-leaved plants at the edges of lawns or as a bold edging to the shrubbery. In formal gardening their massive foliage is well seen in the ornamental vases so common in old-time gardens, and it associates well with the stonework of terraces and formal edgings. They may also be used very happily upon banks of the woodland garden, and mixed with Ferns and Hellebores. The tender kinds are happiest in the rock-garden where they can be sheltered by a handlight in spring. In some conditions these giant Rockfoils are worth a place under glass in winter, where they flower early and are worth growing for the sake of the fine leaves alone. A good way is to plant them out in rich soil after flowering, water them freely all the summer, and if potted carefully into large tubs in October they keep in fine condition all the winter.

The plants are so hardy that no soil can be called too bad for them, and increase is easy by seeds, by cuttings, or division every second or third year. Dividing should be done immediately after flowering, and though cuttings will root at almost any season, they are best made at about the same time. When the tips of long woody stems are taken as cuttings, side-shoots break all down the old stems, but these seldom flower till their second year of growth. Where it is desired to enjoy the autumn leaf-colour of such kinds as *Stracheyi* and *purpurascens*, and hybrids such as *Brilliant* and *Coralie*, they should be grown in open places and in rather poor soil, the finer shades of red, crimson, and yellow, being seen only under such conditions. The finest of all in this way is a new and little known kind, *M. yunnanense*, which is well spoken of by all who have grown it. The plants seed freely and many fine crosses, varied as to habit and colour of flower, have been raised by Mr. Thos. Smith of Newry, the hybrids of *cordifolia* and *purpurascens* proving especially rich and vigorous. Seven or eight species are known, all coming from the Himalayas and the mountains of eastern Siberia, this group of *Saxifraga* being unknown in other parts of the world. The kinds may be known by the following brief descriptions :—

Megasea Aitchisoni.—Quite a new early-flowering species of dwarf growth, with small erect leaves edged with fine hairs, and pretty white flowers. Mr. G. Reuthe, in whose collection it appears, assures me that the plant is distinct and fully hardy.

Megasea cordifolia.—This and the next kind come very near together and are possibly forms of the same plant, brought from Siberia in 1779. From its hardiness and vigour it is the commonest kind in gardens, with glossy almost heart-shaped leaves which are larger, broader, and more undulating than in *crassifolia*, and broken at the edges into little rounded notches. The rosy flowers are larger, later in coming, and free from the trace of lilac seen in *crassifolia*, clustered also in denser masses and held more erect. A good variety is called *purpurea*, a plant of very strong growth and fine evergreen foliage tinged with bronze. The flowers are of a deeper rosy-purple coming in heavy clusters upon vivid red stems of nearly 2 feet—one of the finest kinds for massing. The so-called white form is not pure, though nearly free from colour when grown under glass.

M. crassifolia.—A variable plant from Central Asia, which it covers from the Altai Mts. to Mongolia. Perfectly hardy it resists rough treatment and severe cold, and grows freely in good soils. It blooms very early and its great heads of fragrant flowers, in loose clusters which are divided into long drooping sprays, are soft pink in colour with a trace of lilac. The dark green leaves are smaller than in *cordifolia*, slightly indented at the edges, and instead of showing a broad base they taper rapidly towards the stalk, creeping down it for some distance like a narrow wing. There are many garden forms of this useful old plant, the most distinct being *alba*—a dwarf kind of moderate growth and seldom more than 6 inches high, with white flowers and leaves prettily tinted in winter. *Media* is a distinct and pretty kind with dark shining leaves and a profusion of bright rose-pink flowers on strong stems; *ovata* has oval leaves in which the blade is not narrowed to the stalk, and flowers of deeper colour displayed well above the foliage. *M. orbicularis* is a semi-prostrate variety which is often classed as a species but is more correctly a small much-branched form of *crassifolia ovata*, in which the leaves are more rounded and the flowers a pale rose-colour, very profuse and finely displayed. This kind is the earliest to flower, beginning with February or even earlier in warm districts, and with a delightful scent of almonds and Hawthorn. Other kinds are *rubra*, with darker flowers; and *aureo-marginata* in which the leaves are edged with yellow.

M. ligulata.—A charming kind from the mountains of Nepaul, of a very dwarf habit and less hardy than those just described. The plant spreads by long woody stems bearing at the growing point a crown of glossy evergreen leaves, oval in outline, tapering gradually to the base. It blooms very early—often by the end of January—and for this reason is safest under glass in all save the warmest gardens, flowering for many weeks even in a living room and the flowers agreeably fragrant. Borne in large loose clusters their colour varies from bright pink to deep rose with crimson anthers. When in the open air the plants need shelter and slight shade, for while rarely killed outright by frost a series of sharp winters will kill them by inches. After a fine season the foliage often turns a brilliant red in autumn. Syn. *M. achmidtii.*

VARIETIES.—Several forms of this species are grown, the most distinct among them being *ciliata*, a beautiful plant from the Mussoree Hills of Nepaul, at a lower elevation than *M. ligulata.* It is consequently less hardy and only succeeds well as an open-air plant in the warmer parts of the country, and even then is apt to lose its leaves from frost. With shelter these are evergreen, large, and broadly oval, hairy on both sides and crisped around the edges, which bear a narrow red line and a thick fringe of bristly hairs. The flowers come in loose clusters which are smaller than in most kinds and so early as to be often spoiled by frost. Their rosy-white colour varies, with sometimes a deeper red towards the centre and sometimes towards the edges of the petals, while the whole effect is increased by the dark red anthers. So charming a plant well repays the protection that is needed to bring it to perfection in many gardens, shelter, partial shade, and a light soil, being the best conditions. There is a very distinct pure white form known as *ciliata alba*, which bears long-fringed leaves and small clusters of large white flowers with a tuft of reddish-brown anthers. Minor forms are *rubra*, with darker red flowers; dwarf-growing forms known as *compacta* and *nana;* and *speciosa*, which comes between *ciliata* and *atracheyi* and appears to be a cross. It is a very good plant with large heart-shaped leaves and abundant flowers of clear pale pink, and while hardier than *ciliata* in the open it makes an effective pot-plant for the cool greenhouse. A plant grown on the continent as *M. ornata* is probably only a form of *ligulata*, remarkable for its vigour and the size and number of its flowers.

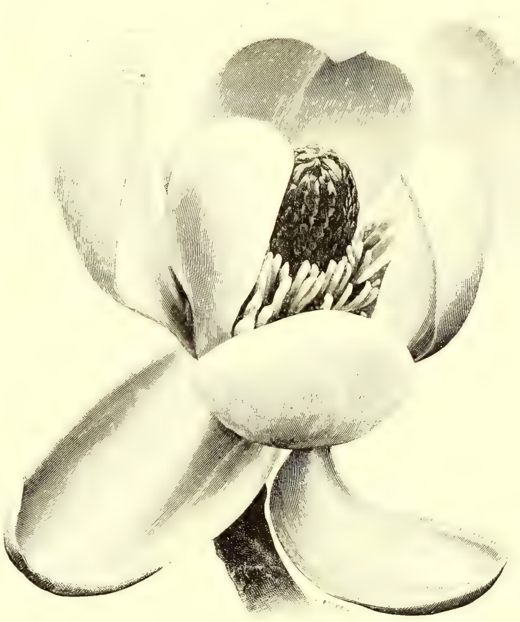
M. Milesi.—A plant of garden origin formerly regarded as a form of *M. atracheyi* but now supposed to be a cross between that kind and *ligulata* var. *ciliata.* It is of very dwarf growth and bears pure white flowers of great beauty, particularly in the early stages, the distinct claw to each petal distinguishing them from those of any other kind. Coming before the leaves (which die away in winter) and on short stems, the flowers need the shelter of a handlight, indeed the plant is often grown in pots for spring flowering.

M. purpurascens.—Often regarded as the best for fine colour, this is of slower growth than most and less certain as to flowering. While fully hardy it does not bloom freely unless grown in deep rich soil and a moist place, with partial shade in summer. The leaves then come of a fine bronzy-green with a reddish tinge towards the edges and along the veins; smaller than in the other large-leaved kinds, they are broadly-ovate in shape, crisply rigid in texture, and beautiful in their autumn tints of bronzy-purple, yellow and crimson. To induce this rich leaf-colour however one has to go without flowers, for the dry and sunny spots in light soil which bring out these leaf-tints are conditions quite against flowering. The flowers come in May upon stems of 10 to 12 inches and are of a deep purple with the stems of a bright crimson which is beautiful in contrast. Mountains of Sikkim.

M. Stracheyi.—This kind, also from the mountains of North India, differs from all others, and while coming nearest to *ciliata* it is hardier and bears more numerous and better flowers and broader leaves arranged less regularly. Beautiful when well grown it does not succeed everywhere and, coming from a wide range of mountain-side, shows marked differences in leaf, habit, and colour of flower according to elevation. For garden effect it is less useful than other kinds, losing its leaves in winter and mostly flowering before they come again. To do well it should be in a warm corner of the rock-garden, with free drainage amid sheltering stones, and as they begin to open the flowers should be covered with glass to keep off wind and the splash of heavy rain. In this way they come larger and of a purer white or rosy-white. The leaves are erect, nearly as broad as long, held upon short red stems and edged with very short hairs, and as in the last kind they are at their best in the autumn, when the stems and veins take on a deep crimson which gradually spreads over the entire surface. The flowers are beautiful and freely produced in a good season, as dense drooping clusters of white or pale pink with a darker centre. Syn. *Saxifraga unguiculata.* VARIETIES. Among the forms of this plant are *alba*, with white flowers; *afghanica*, a little plant in some respects approaching *M. ligulata* but distinct in its smaller flowers which are nearly white on first expanding, deepening to pale rose with exposure. *Stracheyi athysanodes* is a very dwarf form never much above 6 inches high in all, with broadly-oval leaves on short thick stalks, and hairy on both sides but especially beneath. The creamy-white flowers at times tinged with carmine appear in April on short crimson stems which are so little branched as to appear almost simple. The plant is a little tender for the open air but does well in pots in a cool frame or greenhouse.

M. yunnanense.—A remarkable plant similar in stature to *M. afghanica*, but the leaves are much more glossy. The flowers are whitish and scarcely rise above the leaves upon stems of 6 to 9 inches. But the glory of the plant is in its superb winter colouring, the leaves taking on a rich copper-colour, shaded with purple, which remains until late in spring. It is perfectly hardy, and for winter effect in the rock-garden there is nothing to match it.

Hybrids. There is now a long list of hybrids, for the most part raised by Mr. Thos. Smith of Daisy Hill, Newry, among whose hardy plants these Megaseas are an interesting feature. They fall roughly into two sections with large and small leaves, and may be briefly described as follows: *Athlete*, one of the best, with massive undulated leaves and good habit; *Brilliant*, large leaves which are richly coloured in autumn and winter, and bright purple clusters upon crimson stems; *Campana*, a distinct dwarf kind with small crowded leaves nestling close to the ground and bell-shaped heads of rosy-lilac flowers on tall slender stems of 1½ feet; *Coralie*, a plant like *Brilliant* in leaf and flowers but with a very different way of growth; *Corrugata* has a dwarf habit with very large rough leaves of a reddish shade, and pink flowers; *Crœsus*, a pretty little miniature with small leaves crowded close to the ground and finely coloured in autumn, and rosy flowers on stems about ½ a foot high; *Delia*, large rounded leaves of glossy appearance, becoming bronzed in winter; *Delicata*, pretty pale pink flowers; *Distinction*, a seedling with small leaves and a dwarf habit, remarkable for its heavy clusters of pale pink flowers; *Giant*, an early blooming kind with purple flowers and very large bronze-coloured leaves which are finely crisped and undulated; *Gigantea*, with very large leaves and tall masses of rosy flowers; *Hybrida splendens*, dwarf but free, with heads of rosy-crimson on long stems; *Hybrida nana*, a reduced form of the last with paler flowers; *Iris* is best for its leaves which are small, crowded together, and finely edged and blotched with bright red; *Magnet*, handsome leaves and rosy flowers; *Magog* is like a strong form of *M. cordifolia*, with large leaves becoming reddish-bronze in autumn, and big rosy flowers; *Memnon* is another early kind, with purple flowers and large leaves tinged with the same colour in autumn; *Pigmy*, said to be the smallest of all; *Progress*, with the largest flowers of all, rosy-purple in colour upon tall stems, and green leaves coming nearly prostrate; *Puck*, another kind with large flowers and smooth pale-green leaves; *Spathulata; Sturdy*, compact habit and crumpled dull-green leaves with stout stems and large heads of rosy flowers; *Sunshade*, with very heavy spreading flower-heads. B.



Magnolia Hypoleuca. (*Engraved for "Flora."*)

MAGNOLIA HYPOLEUCA.

This scarce Japanese tree flowered in the garden of Mr. B. E. C. Chambers at Grayswood Hill, Haslemere, for the first time in June of this year. A fine young tree, which has been planted just over ten years, carried 27 flowers, one of which is shown life-size in our engraving. They are creamy-white in colour and very fragrant, with a ring of reddish-purple anthers in the centre. Mr. Chambers tells us that only one seed-cone has set, but when these fruits are carried freely their bright red colour makes this tree one of the most beautiful in the mountain forests of Japan, where it reaches the size of a timber-tree 100 feet high. The tree is also remarkably handsome in its leaves, which are over a foot long, dark green above and silvery beneath—a feature from which the tree derives its specific name. A detailed reference to *Magnolia hypoleuca* will be found in Mr. Nicholson's monograph of the genus in the first volume of Flora, page 20.

CLEMATIS MONTANA var. RUBENS.*

This well-marked variety of an old favourite was first made known from specimens collected in the mountains of western Hupeh, central China, by Dr. Henry, and first described by Otto Kuntze in *Verhandl. Bot. Ver. Brandenburg*, 1884, p. 142. I rediscovered it in the same region as Dr. Henry and sent seeds to Messrs. Veitch in the autumn of 1901, and plants raised from these seeds flowered at Coombe Wood in the spring of 1903. The variety differs from the type not only in the colour of its flowers but also in that of its leaves and young shoots, which are dark and distinctly reddish. It is of the same free-growing and free-flowering nature and is equally hardy. Its value as a new and distinct plant for gardens was seen when exhibited at the Royal Horticultural Society on May 23 last, when the plant was awarded a First-class certificate.

This variety is interesting as being the only striking variation from the common white form, which extends from the western Himalaya (Kashmir) to the mountains of western China, where it is abundant at elevations of 6,000 to 11,000 feet. It is often associated with Rhododendrons, trailing over them and enhancing their beauty. The white form does not occur in Hupeh (central China) neither does the variety occur in western China, each occupying its own area and (so far as the researches of Henry and myself extend) never associated with the other. All Henry's specimens in the Kew herbarium, including his No. 10,748 from Yunnan, belong to the variety *rubens*. In the mountains of western Hupeh between 5,000 and 9,000 feet, the rose-coloured variety is quite common. It occurs in the open glades but is more abundant on scrub-clad mountain-sides, trailing over bushes. It flowers in the latter part of May and is then very pretty. The Chinese call it the "Ta-huai-t'ung." *Huai-t'ung* is a more or less general name for Clematis, and *Ta* signifies great. It is a great pity that *Clematis alpina* grows so weakly, for otherwise it and the white and rose forms of *montana* would make a charming trio of early-flowering Clematis.

E. H. WILSON.

THE HARDY WILD CLEMATIS.

Some of the smaller and less grown Clematis are more precious for the garden of hardy flowers than the larger hybrids. The wild Clematis of the world form a group of well over 200 kinds and by far the greater number come from temperate and mountain regions and are therefore quite at home with us. These graceful climbers with their rapid growth and freedom of flower, their hardiness and beauty, deserve more care and space than is often given to them. For clothing walls and pergolas, for summer bowers and graceful arches, for all soils and positions—even in half-shade, these wild Clematis serve us well, while by a selection of kinds planted in well chosen places, one or other may be had in beauty of flower or fruit almost from year's end to year's end. The beauty of these free-

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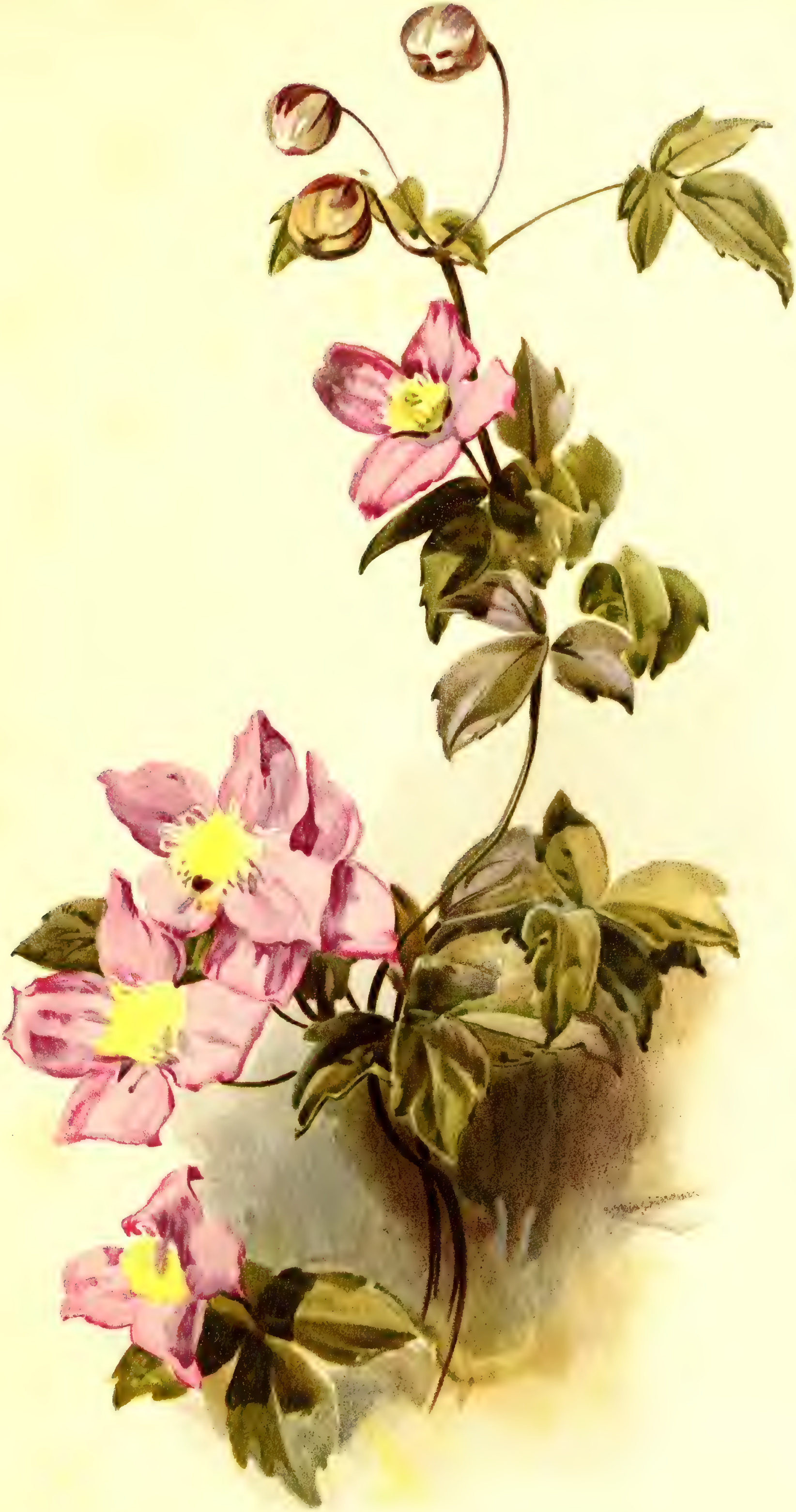
* With a coloured plate from a drawing by H. G. Moon in the Botanic Garden, Cambridge.



growing Clematis is never better seen than when the starry flowers look down from natural arches in the woodland, or gather in fleecy billows upon the hedge-side. The wild-garden, the woodland, the skirt of the orchard with its hoary standards, the hedge-side with its warm banks and moist ditches, all, with a touch of that insight which makes Nature ours, may be transformed into a "virgin's bower," by the use of these graceful climbers.

Clematis Orientalis.

They come from all parts of the world and are specially abundant in the northern hemisphere, while so many kinds are from the far East that over 70 new species have been described within the past few months, and, while many of these are of botanical interest only, others promise to be plants of garden value. The variety in form and character of the wild Clematis is remarkable, ranging from herbs of a foot high to stout climbers of 50 feet or more and reaching to the top of lofty trees. The form of flower is now that of starry clusters, now drooping bells; those of the far East with massive flat flowers, those of the far West with urn or pitcher-shaped blooms; others tubular or inflated, others in which the flower consists of little save a bunch of feathery stamens, while in the *Atragene* section these stamens are converted into narrow petals with the effect of a double flower. And these are the only petals seen in the flowers of the Clematis, for the wide outer segments four to eight in number, are not petals but gaily coloured sepals which fulfil the same function.

Culture.—Though little skill is needed to grow many of these hardy wild kinds, a few such as *alpina* and *coccinea* need greater care, and all will thrive in proportion as their needs are known. Light rich soil which is fairly moist is best suited to the Clematis, and poor dry soils should be improved by adding cow-manure, and stiff soils lightened with leaf-mould, sand, and lime-rubbish—especially if lime is at all wanting. Once established, all they need is an annual dressing of manure, and water in a dry season. Pruning often becomes a matter of space, where old plants must be kept in bounds. The points to remember are, that the spring-flowering kinds blooming on ripened wood of the previous year, must be pruned at once after flowering; the later sorts, flowering on new wood, should be cut back in winter. The weaker kinds may be left quite alone and the strong growers pay for thinning, and this is especially needful in kinds like *C. paniculata* which flower late and fail unless well ripened. In planting be it remembered that poor varieties of some kinds such as *crispa*, *flammula*, and *coccinea* abound, and that others like *grata* are not easily found true; a little extra trouble to ensure a good form is well repaid. After being planted a few years some kinds grow bare and do not break from the base unless cut right back—a thing not always convenient. This may be avoided by planting in pairs, which allows for alternate hard cutting by which the lower stems are kept covered. Some kinds like *montana* will make their way anywhere, while, if fighting against tree-roots and established plants, the less vigorous growers should be given a start by sinking in the ground a bottomless tub of good soil. While planting amongst evergreens and low trees gives natural and charming effect, the support must not be too pliable, nor the Clematis so trained that wind-waving would injure the stems at the base—the point attacked by fungus.

INCREASE.—This is easy in several ways, though grafting is now the universal practice of the trade. Even grafted plants may be eventually had on their own roots, by planting deep and gradually earthing round the collar as the plants gain a foothold, or by pegging down a part of the stems under ground. Ripened shoots of almost any kind may be layered in this way, and cuttings of the young wood taken in late spring or early summer and plunged in sand and bottom heat, will soon root and grow away freely. Most kinds come freely from seed and the seedlings grow fast and flower in their second year. The seed should be sown as soon as possible after ripening, either in a cold frame in autumn or in gentle heat early in spring.

C. aethusifolia.—A bushy plant of 4 to 6 feet, with slender stems and variable leaves, mostly cut into narrow segments of a pale green colour and pretty for decoration. The drooping flowers are thimble-shaped and yellowish-white, borne singly upon erect stems, and very freely all the summer. Mongolia. A variety *latisecta* from N. China, has hairy leaves with segments as broad as long which are evenly toothed and lobed.

C. alpina.—A variable and lovely kind. This species covers a vast area of mountainous country from central Europe to the far East and thence to N.-W. America. Its slender ash-grey stems of 3 to 6 feet twine upwards in early spring, and are naked until from the swollen joints appear leaflets of pale green followed closely by the graceful lavender-blue flowers fine in colour and form. This is not often seen at its best in our gardens but it is charming where it does well, left to clamber over a fence or an arbour with a north aspect in the drier parts of the country. Several distinct forms exist; *alba*, a Siberian form of stronger growth, in which the flowers are almost wholly white and 2 to 2½ inches across; and *austriaca*, a selected form in which the flowers are larger, and narrower as to shape. Syns. *Atragene coerulea*, *sibirica*, and *austriaca*.

C. apiifolia.—A graceful hardy climber of about 10 feet, with leaves cut into three leaflets, and dull white flowers nearly an inch across, appearing in August and September. China and Japan. It comes so near the American *C. virginiana* as to suggest an Asiatic form of that plant.

C. brachiata.—A new kind of vigorous growth from South Africa, which has passed several winters in the open at the Cambridge Botanic Gardens but in most places would be safer under glass. The flowers are greenish-white and very sweet.

C. calycina.—A plant often confused with *C. cirrhosa* though distinct and wild only in the Balearic Isles, whence its synonym of *C. Balearica.* An evergreen, this is hardy in the warmer parts of Britain and Ireland, flowering at midwinter in sheltered places where its long dark-brown stems can be trained against a sunny balustrade or wall. It is worth growing if only for its finely-cut leaves of a pretty bronze colour in winter and useful for cutting. The bell-like flowers open from December to March, and are creamy-white freckled with reddish-purple on the inside, and fragrant. Their size varies in different plants, from a little over one, to nearly two inches wide.

C. campaniflora.—A plant of graceful and free growth from Portugal, with strong stems of 10 to 15 feet and leaves cut into a score or more of leaflets. The flowers come on long twining stalks from June, and though only about an inch across and never more than half open, the number of pale purple bells makes this an elegant climber. The seed-pods set freely, but are not ornamental.

C. cirrhosa.—The Evergreen Virgin's Bower. A robust evergreen climber with strong rope-like stems which cover tall trees in its own country—the shores of the Mediterranean. With us it is less vigorous though hardier than *calycina*, with flowers they are less pretty and later in coming, and glossy green leaves which are broader and not cut at all, or simply divided in threes. The little drooping bells of white or greenish-yellow, covered with glossy down on the outside, are pretty especially while in bud, the pale-green pendants looking like little silken nuts. Only does well in the open air in the south of England.

C. coccinea.—Though strictly a form of *C. Viorna* from the Western States, this differs so widely from that uninteresting species that it may well stand apart. It is not an easy plant to establish and only does well on light warm soils and with abundant air and sunshine. Even then it takes some years to establish and needs feeding, with protection from slugs in early spring and from cold winds which induce mildew. The leaves and stems are a pretty glaucous green and the coral-red urn-shaped flowers with yellow edges, appear in succession as the stems lengthen, springing singly from the leaf-axils on long stems. Owing to their fleshy nature the flowers last a good while and are very beautiful in a good form, but dingy forms are common and some are almost wanting in colour. The plant also grows well in pots, but is never so finely coloured under glass. Syn. *C. texensis.* By crossing with *lanuginosa*, *Pitcheri*, and other species, new and intermediate forms have been raised.

C. connata.—A stout species from a great elevation in the Himalayas, with leaves cut into three or five leaflets and pale bell-shaped yellow flowers in autumn, about an inch across. These give place to silver-grey seed plumes of graceful effect.

C. crispa.—A low-growing plant from eastern North America, rising only a few feet with limp evergreen leaves and fragrant bell-shaped flowers of purple, lilac or nearly white. It is one of the most difficult kinds to distinguish, embracing forms differing as to shape and size of leaf and flowers. The flowers appear in June and last till autumn, and are very variable, some forms being bright and pretty and others not worth growing.

C. Douglasii.—A low half-shrubby kind from the Rocky Mountains, with finely-cut leaves and bell-like flowers an inch long, dark purple inside and paler without from June onwards upon stems of about 2 feet.

C. Flammula.—Fragrant Virgin's Bower. A well-known climber hardy and free as the Traveller's Joy of our hedges—indeed this may be said to take its place from the centre of Europe to the Mediterranean. It bears shorter wreaths of white flowers in the autumn, purer in colour than *Vitalba* and more fragrant, but as with many wild Clematis, seedlings vary greatly and bad forms are common. The flowers come in August and September and give place to masses of feathery seed-pods which last in beauty far into the autumn and are useful for decoration. Left to ramble at will this is one of the best of all plants for screening rough walls and untidy places ; to be seen at its best it requires full sunlight. Good selected forms and some coloured varieties are grown in gardens, the best being *robusta*, larger and with leaves of firmer texture, flowering a little later; *rubella*, in which the flowers are red on the outside; *cæspitosa* in which they hang gracefully upon long slender pedicels ; and *rubra marginata*, a good variety in which the flowers are suffused with ruby-red.

C. florida.—A slender climber of 9 to 12 feet, brought long ago from Japan and now almost unknown in its wild form, though double-flowered and other garden varieties are grown. The leaf is variously divided into small leaflets, and the flowers, composed of five or six sepals, open very flat and are 2 to 4 inches across, creamy-white in colour with a bunch of dark stamens in the centre and bars of dull purple across the outside of the flowers. Japan. Forms with violet and rosy flowers exist, and a double white variety *Fortunei*, in which though lasting well the blooms are more curious than beautiful, turning pink with age. *C. bicolor* (Syn. *C. Sieboldi*) also with double flowers, is classed as a form of *florida*. A very distinct kind, it is hardy though of delicate appearance, and easily grown in a warm corner ; it is very free also in its flowers, which open slowly and last a long while. In these the broad segments are greenish on opening, clearing to creamy-white with a green band down the centre of the lower side ; the inner part of the flower is composed of a thick tuft of narrow violet-purple petals, set off by a white edging.

C. Fremonti.—A plant very near *C. ochroleuca* of which it may be only a geographical form. It throws herbaceous stems 1 to 2 feet high and seldom branched, with uncut leathery leaves almost devoid of stem and entire save for a few coarse teeth. The purple flowers droop from the tips of the shoots in July and August, with recurved tips and downy edges. Western United States.

C. fusca.—This kind is nearly midway between the climbing and shrubby species, with trailing stems of 6 to 8 feet. It comes from N.-E. Asia, and is remarkable for its solitary bell-shaped flowers, an inch long and recurved at the tips, opening in July. They are reddish-brown in colour and coated with down which extends to the stems as a thick brown wool. The flowers give place to heavy rounded heads of seed, studded with feathery tails.

C. grata.—A rare kind from the Himalaya, seldom seen true. It is a free-growing climber of about 12 feet, with stout wiry stems and deep green leaves cut into five rounded and hairy leaflets. The flowers come with great freedom in September and October as vast loose heads, sometimes 18 inches long, the blooms an inch or more across and composed of four very narrow white sepals shaded with purple on the outside, and a central mass of pure-white stamens. From the stiffness of its stems this has been wrongly called an herbaceous Clematis ; it is best grown upon sheltered walls.

CLEMATIS HERACLEAFOLIA var. DAVIDIANA.

C. grewiæflora.—A rare Himalayan species and somewhat tender in all save the warmer parts of our country, but worth a place under glass in colder districts for its freedom during winter. The flowers are not showy being of a clear tawny yellow colour like a brightly tinted wreath of Hops, and coming freely at such a season, its laden sprays are most welcome. Thrives upon sheltered walls near the coast in Ireland, Wales, and the south-west of England.

C. heracleafolia.—This is not a climber but a shrubby kind standing as the type of a small group of bush-plants spread over eastern Asia. It has stout stems of about 2 feet, with large dark-green leaves cut into three oval leaflets and set upon long stalks. The small tubular flowers are gathered into whorls upon long erect spikes, pale blue in colour, coming through August and September. China. Increase by root-division. Syn. *C. tuberulosa.* The variety *Hookeri* differs from this chiefly in its pale mauve-coloured flowers.

Var. *C. davidiana.*—The finest of the forms of *C. heracleafolia*, with stems of about 4 feet and very large grey-green leaves divided in threes. The flowers come from the end of July into September, as dense terminal clusters or singly and as smaller clusters from the axils of the leaves. Though not very lasting, they open in succession during several weeks and are so fragrant as to scent the air all around. In the prettiest form the tubular flowers are a delicate blue with yellow anthers, and shaped like a single Hyacinth. There are also paler forms to almost white, in which the flowers are often larger but less effective. Even the dried leaves are agreeably scented. This plant is fully hardy only in southern gardens, and is best at the foot of a sunny wall, with a covering of litter in winter. China. Syn. *C. mongolica.*

Var. *C. stans.*—A Japanese form of the plant, with stems of 4 to 5 feet and handsome dark-green leaves covered with hairs and variable as to outline. In this kind the terminal clusters are less full and the pale-blue flowers smaller, but they come so late—September and October—as in a measure to atone for want of brilance, and for bold foliage this is one of the best.

C. integrifolia.—An old border plant introduced from the south of Europe, and unlike any other kind, with stout stems only 12 to 18 inches high which droop prettily under their load of flowers. The leaves are large, without stem, borne in opposite pairs, and uncut. The nodding flowers appear in August, each upon a long stalk but hanging in clusters, the blooms composed of thick wavy petals, deep blue without, with a pale centre, and velvety-grey inside. This little plant is spoiled if trained too formally and is seen to the best advantage in the rock-garden, drooping over a ledge. Increase by seed. Its variety *diversifolia* is a form from Asia in which the leaves are more or less cut, and the variety *Durandi* is a cross between *integrifolia* and *lanuginosa.* This is of much taller growth, with leaves broader and more massive, and larger flowers of dark violet-purple 3 to 4½ inches across, with a long season of beauty, making it one of the finest hardy border Clematis.

C. lanuginosa.—Though to this species our large-flowered garden Clematis owe more than any other, the wild plant found by Fortune near Ningpo in South China is hardly known in gardens. Its stems are 4 to 6 feet high with leaves divided into three heart-shaped leaflets woolly-grey underneath. The buds are also woolly and the flowers 6 inches across, with broad overlapping sepals of pale mauve or bluish-grey and pale reddish-brown stamens. This plant thrives best in a cool north aspect. There exist two or three wild forms of the plant such as *pallida*, with paler flowers and a long season of beauty ; and a scarce form with flowers of intense lilac-blue, and grey-green leaves almost silvery in the sunlight and very woolly beneath.

C. ligusticifolia.—A vigorous climber from the Rocky Mountains, with stems of 30 feet and small white flowers. The flowers are fragrant, about ¾ inch across, coming in August, and give place to handsome silky seed-vessels. The variety *californica* has smaller and more downy leaves.

C. montana.—Among the best known of the wild Clematis, 20 or more feet in height, flowering early in the year. It grows in any soil or position and will hold its own even against Ivy and tree-roots, but needs space and sun to do well. The flowers come upon the old wood so that pruning should be done in June, after flowering, with a later trimming of the young growths upon very strong plants. The flowers last well when cut, particularly those springing from the short side-spurs which outlast these upon longer foot-stalks. They have a vanilla fragrance which grows stronger as they fade.

There is an improved variety *grandiflora*, in which the flowers are 3 to 4 inches across, and a fine new form *rubens*, introduced by Messrs. Veitch, of which we give a coloured plate with a short account by its introducer.

C. ochroleuca.—An herbaceous species from the eastern states of North America, coming near *C. integrifolia* in habit and foliage, with stems 1 to 2 feet high and leaves silky beneath especially while young. The flowers are solitary and erect at the tips of the shoots, yellow outside and creamy-white within, followed by plume-like seed-vessels. A scarce plant even in its own country.

C. orientalis.—Yellow Virgins Bower. A plant climbing freely from 12 to 18 feet, with limp grey-green foliage cut into rounded leaflets of glossy texture and fragrant pale-yellow flowers in late summer and autumn. They are 1½ to 2 inches across, carried freely on slender stems, and in fine seasons continue very late, especially in places near the sea. Their colour varies from a dull yellow-green to clear pale yellow, for, covering a vast range in Asia, it occurs in several forms distinguished by a variety of names, such as *glauca*, *flava*, and *graveolens*. The pretty fragrant flowers are followed by silky seeds with long silvery tails, useful for mixing with autumn flowers.

C. paniculata.—A vigorous climber from Japan and one of the best kinds in the south of England, though from its lateness in flower it does not thrive north of the Thames valley. It does best against a sunny house-front, where the wood is ripened and the flowers are sheltered from frost. These may then be cut in trails many feet in length, crowded with fragrant starry flowers 1 to 1½ inches across of a creamy-white colour. The plant grows many feet in a season, hence the greater need for ripening and to be well cut back in spring. The flowers succeed those of *C. flammula* and prolong their effect into the autumn, being followed in fine seasons by clusters of seeds with a ruddy glow. The dark-green shining leaves are cut into three or five leathery leaflets and keep their freshness until the end of the season.

C. patens.—As a parent of garden varieties this has played a part second only to *C. lanuginosa*, but the old wild form is well-nigh forgotten. It was sent out by Siebold many years ago from the gardens of Japan, but is perhaps a native of China. As a plant it is taller and more slender than *lanuginosa*, with leaves cut into three or five narrower leaflets, and pale mauve or blue flowers. Seedling forms with white and deep violet flowers are grown in gardens, and imported kinds are *grandiflora*, and *Standishi*, with light purple flowers 5 inches across.

C. Pitcheri.—This belongs to the section with pitcher-shaped or tubular flowers, and is only worth growing in its best form. Stems of 6 to 8 feet, with bluish-green leaves composed of several pairs of rounded leaflets, and pitcher-shaped flowers covered with short hairs, coming singly at the ends of the main shoots. The flowers are often small and dingy; in the best forms they are an inch long and wide and bluish-purple, followed by clusters of downy reddish-purple fruits. Western United States. Syn. *C. coloradensis*. The variety *Sargenti* has small flowers, and in variety *lasiostylis* there is no trace of yellow, the tips of the flowers being a deep purplish-blue and the seed-clusters larger and of richer colour.

C. recta.—One of the best herbaceous kinds, with stout erect stems of 3 to 4 feet and masses of sweet white flowers an inch across, plentiful from June onwards and good for cutting though the stems are a trifle stiff. Several varieties are grown, including one with very double and more lasting flowers of a purer white; an early-flowering kind with ruddy stems; and *lathryfolia*, of tall habit and profuse in flower. South Europe. Syn. *C. erecta*.

C. reticulata.—A slender climber allied to *crispa*, with leathery much-veined leaves and solitary bell-shaped flowers of dull purple during June and July. In one form the flowers are dull yellow within and flushed dusky-red on the outside. Southern United States.

C. Robertsiana.—A hardy kind brought by Dr. Aitchison from the mountains of Afghanistan in 1879. Its flowers are large, 3 to 5 inches across, and of a pale lemon-yellow colour nodding upon long erect stalks. This kind is as yet hardly known in gardens but should prove very useful, and is interesting as seeming to supply a link between the *Atragene* section of the genus and the true Clematis.

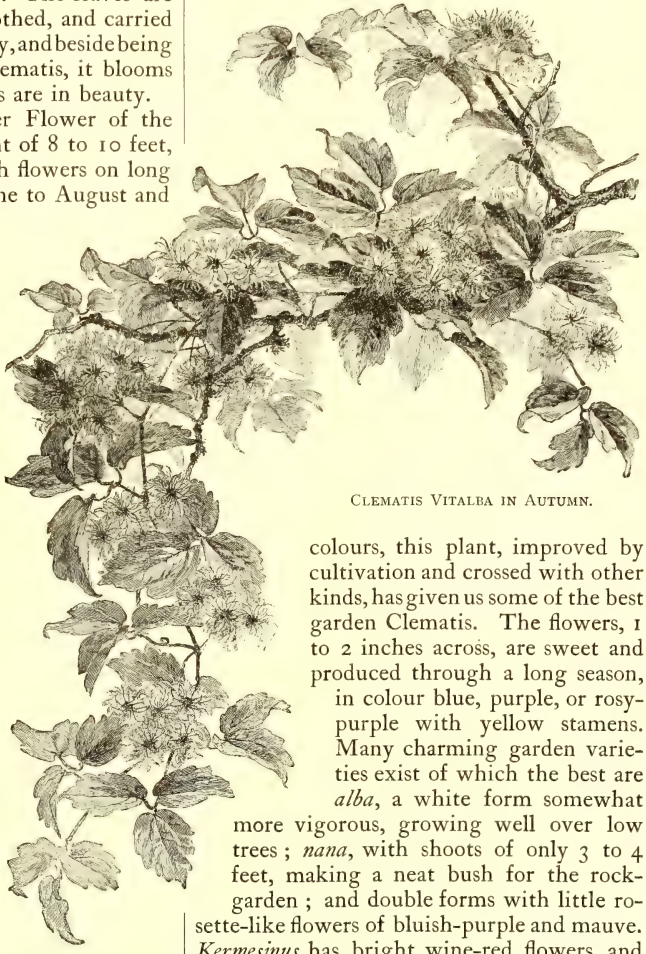
C. tangutica.—Though sometimes classed as a form of *C. orientalis* this plant is so different that the question arises whether it should not appear as a distinct species. For while *orientalis* blooms in autumn *tangutica* blooms in spring and upon the old wood, with flowers much larger and of a clear yellow. The leaves are more deeply and closely toothed, and carried upon longer stalks. It is hardy, and beside being the best yellow-flowered Clematis, it blooms at a season when few others are in beauty.

C. Viorna.—The Leather Flower of the United States. An old plant of 8 to 10 feet, with pitcher-shaped purplish flowers on long stems. They open from June to August and the plant is not of sufficient merit to be worth much care.

C. verticillaris.—Another old kind from North America, now rare in gardens. It is a trailing shrub of 8 to 10 feet, with four trifoliate leaves from each joint, giving a clustered effect. Solitary bluish-purple flowers 2 to 3 inches across in May and June, composed of four thin silky sepals and a cluster of narrow inner petals. Syn. *Atragene Americana.*

C. virginiana.—American Virgin's Bower. A good and vigorous plant widely spread over North America, growing 16 to 20 feet, with leaves of three leaflets and dull-white flowers about an inch across, produced very freely and later than in our *Vitalba*. They come in flat heads and with the sexes mostly apart, so that the plume-like fruits are rarely seen in this country.

C. Vitalba.—The Traveller's Joy. A native climber and the most vigorous of them all, especially on chalky soils. Old plants with rope-like stems, will cover tall trees or hundreds of square yards, if allowed to trail freely in woodland. For the wood garden few things are finer in effect, the dull white flowers with a faint scent of almonds being followed by feathery seed-tufts.



Clematis Vitalba in Autumn.

C. Viticella.—Virgin's Bower or "Little Vine" of the south of Europe. Of rapid growth and free in its cross-shaped flowers of various colours, this plant, improved by cultivation and crossed with other kinds, has given us some of the best garden Clematis. The flowers, 1 to 2 inches across, are sweet and produced through a long season, in colour blue, purple, or rosy-purple with yellow stamens. Many charming garden varieties exist of which the best are *alba*, a white form somewhat more vigorous, growing well over low trees; *nana*, with shoots of only 3 to 4 feet, making a neat bush for the rock-garden; and double forms with little rosette-like flowers of bluish-purple and mauve. *Kermesinus* has bright wine-red flowers, and *lilacina-floribunda* grey-lilac with darker veins. The white and rosy forms are very effective planted together. This kind is as free from seed as furze and often sows itself in hedgerows where it comes in wreaths long after the May and Dog roses. It is not quite so vigorous as *Vitalba*, nor quite so pretty in its seed-clusters.

GRISELINIA—A GOOD SEA-SIDE SHRUB.

There are certain exposed spots in our shore-gardens where even the toughest of seaside shrubs are apt to fail. Not long ago I was asked to advise for such a corner, exposed to salt spray and battling winds, and in which a long succession of plants had perished, and in this little group we have the best of shrubs for such a position, hardier than the Euonymus and the Escallonias, thriving in any (even heavy) soil, while fully as sea-proof as the Silvery Atriplex (*Atriplex Thalimus*) of the Mediterranean and far more ornamental. While the greenish flowers are insignificant and their berried fruits never seen in this country, the tough fleshy leaves are so unlike others in appearance that these are among the most distinct of evergreens. Of compact and fairly rapid growth, they soon make dense bushes of 6 to 10 feet, freely branched to the ground and easily trimmed to shape, though best left alone. The leaves are of a light glossy green set upon tough yellow stems, irregularly rounded or wedge-shaped, and with a graceful droop that once seen is not forgotten.

While hardy far into the north upon our coasts, the Griselinias fail inland save in the warmest parts, and are tender round London even upon warm walls. Yet there are no more useful shrubs for the cool conservatory, porches, passages, and apartments where others exist with difficulty. The glossy leaves are easily kept clean and seldom attacked by insects, and, when safe from frost, the shoots will soon cover a wall where even Ivy fails. The plants thrive in pots with a minimum of trouble and are naturally of good shape. Only two species are now recognised by the *Index kewensis*, both from New Zealand :—

G. littoralis, which reaches a height of 30 feet in the southern island under the native name of "Kapook." The leaf is wedge-shaped, greyish beneath, where the veins show very faintly.

G. lucida.—The finer of the two in its very glossy pale green leaves, which are much narrower on one side than the other. It is of smaller growth than *littoralis*, reaching only 10 or 12 feet, with leaves more fleshy and the veins very distinct on the under side.

G. macrophylla passes as a robust natural form of *lucida*, with larger bright green leaves so thick as to be almost succulent.

Cuttings of *G. littoralis* made in August, and put in light soil under glasses in a cool house or frame, root freely in six or eight weeks, the half-ripened weaker side-shoots succeeding better than the stronger tips. Strange to say *G. lucida* is of far more difficult increase ; it is therefore usual to graft it upon year-old cuttings of *littoralis*, choosing the same month and similar conditions for the work. The lower shoots of all the kinds will also root slowly if layered. B.

SONGS OF THE WOODS AND FLOWERS : The Winter Beech.

If any say that Beauty parts from thee
When frost and wind thy summer honours steal,
Stand forth, O Beech, that such an one may see
Beauty as great thy leafage did conceal !

So thou, the West Wind's lithe antagonist,
Art quick to strife, but when his force is spent,
As in a garment meshed of autumn mist,
Thy branches sleep in silver-grey content.

By all the crowning summers thou hast shed,
By all thy well-fought winters, dauntless tree,
Drop benisons upon thy lover's head,
And share thy strength, thy grace, thy hope with me !

Edith M. Thomas.

FLORA
AND SYLVA.

Vol. III. No. 31.] OCTOBER, 1905 [Monthly.

STATE AID IN RURAL WORK.

The Bureau of Plant Industry under the United States Department of Agriculture, is a great aid to the rural workers of the country. Work here left to the Royal Horticultural and other societies or to private growers, is undertaken by the State in America for the common good. Assured of official encouragement, scientists also find it to their advantage to make plant-life and health subjects of their life work, whereas with us the reward of such work is so precarious that the best men cannot afford to devote themselves to it and such results as are attained are mostly too incomplete or too haphazard to be conclusive. The latest addition to the experimental station at Washington is a range of glass for the study of plant disease by the first scientists of the day, while other lines of research undertaken by this department include plant fertilisers and their value for various plants and under varied conditions of soil and atmosphere, and the value of sterilised soils in the prevention of disease and as a means to good growth. Plants specially liable to disease, such as the Carnation, Violet, Lettuce, and the Bermuda Lily, are receiving attention, and information of value has already come to light as to the prevention or destruction of the pests which have brought loss to growers. Thus, as regards the Bermuda Lily, it has been found possible to raise stock from seeds and grow the plants to perfection in just over twelve months, a saving over the old methods of one to two years in point of time, while the seedlings are so nearly free from disease that the experimenters are confident of stamping it out completely within a very few years. Much seed of this vigorous strain, of guaranteed purity and free from disease, has already been distributed amongst the growers, many of whom have found as large a proportion as 70 per cent. of their stock destroyed by disease in recent years. Attention is also being given to the "soft-rot" disease in the White Arum Lily (*Richardia*), now grown in some of the States on a vast scale.

As regards Lettuce, after gathering varieties of as many distinct strains as possible, several thousand hybrids have been raised and are now being tested as regards quality and resistance. Similar experiments are in hand as regards Tomatoes, Clovers, and Celery, gathered from all parts of the world for comparison, crossing, and selection, with a view to obtaining races of increased economic value and specially adapted to American conditions. Nor is the American government unmindful of its new colonies, for the world is being ransacked by its agents for the finest strains of Mango and other tropical fruits suited to the climate of Puerto Rico, and the natives will be encouraged to plant nothing but the best kinds, supplied under guarantee from the government. Many of the best varieties of these fruits are so local in their distribution that a great work might be done for our own colonies the world over upon these lines. Neither is the ornamental sacrificed to material considerations, for side by side are experiments as to the treatment and breeding of Roses; trials of wild Dahlias collected in Mexico and of so new a type and such beauty that important results are looked for; and experiments under glass with a little known Lily (*Lilium philippinense*) of no great beauty in itself but remarkable for its rapid growth. It is hoped by crossing to raise a new race of quick-growing Lilies, which would prove of immense value to florists. Even the least promising wastes are not forgotten by this argus-eyed department, for it is also occupied with batches of Cacti from which it is hoped to obtain spineless fodder-plants for the desert tracts of the Western States, which must gain in importance as the land is slowly made capable of supporting life.

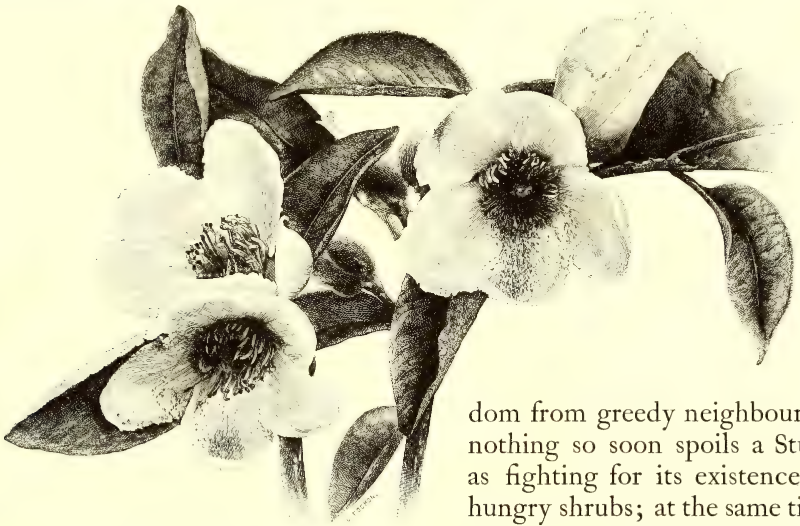
It may be said that the entire world is now so cosmopolitan that, though America may gather the first-fruits of her enlightened policy in matters such as these, the benefits must ultimately be shared by all the world. But, apart from the selfishness of such a view, American raisers are working for a climate and conditions so different from our own that it by no means follows that what is best for America is best for us. Even Spain has recently adopted a common-sense scheme for the improvement of her fertile land and the reclamation of marsh and mountain tracts long left waste. Among other inducements to good cultivation this scheme allows for the total remission of all taxation for lands newly planted, during periods varying from two or three to seventy-five years, according to the nature of the work done and the character of the ultimate yield. In some cases a distinct period is fixed, and in others an indefinite time is to elapse, allowing the yield to reach a certain proportion before making any return to the State.

In view of the increased attention now given to matters of such importance by governments the world over, is it not time for our own to realise the need of a forward policy aimed at the development of the vast latent wealth of our country as regards agriculture, horticulture, and forestry? What is there to prevent the authorities at Kew, or an additional department equipped for the purpose, undertaking practical work of this nature, and empowered to retain for the nation the services of those best qualified to lead their fellows in matters of practical culture and the constant war with insect pests and disease?

* * *

STUARTIA.

Though among the most lovely of flowering shrubs and in bloom at a time when the shrub-garden is past its best, the Stuartias are little planted and well-grown examples are seldom seen. This is in part due to the call for evergreen shrubs; in part to the slow growth and difficult increase of the plants themselves; and also to the fact that they are supposed to be "capricious" if not invariably difficult. Admitting that the Stuartias are unfitted for bleak northern districts and for the coldest soils, there are many gardens in the south of England where they are hardy and bloom freely. The flowers, like those of a large single Camellia, are beautiful in their purity and fine form and so abundant upon well-grown plants that the tree stands outlined in white. Once well planted they need no care beyond mulching in light soils and during dry seasons, and the removal of weak and exhausted wood once in two or three years. To do well they should stand in moist ground with roots protected from direct sunlight; this is of more importance than a shady place, for though the plant will bear a fair amount of shade in America, with us they need all the sun they can get to ripen the wood. The spot selected should be "open" as regards freedom from greedy neighbours, for nothing so soon spoils a Stuartia as fighting for its existence with hungry shrubs; at the same time it must be sheltered, for bleak wind does more harm than frost. The most vigorous grower among the introduced kinds is the Japanese *Stuartia Pseudo-camellia*, flowers of which are shown life-size in our engraving; it reaches tree-size in its own land and is already represented by fine examples in this country, though the last to be introduced. It is also the finest kind in its autumn colour, assuming rich tints of yellow, orange, and scarlet. Though the least vigorous and hardy



Stuartia Pseudo-camellia. (*Engraved for "Flora."*)
From a Plant in the Nursery, Coombe Wood.

in growth, the flowers of *S. virginica* with their contrast of white and crimson, are very beautiful, and *S. pentagyna* has charms of its own and is profuse in flower. Most of the books recommend peat-soil for these, but this is not necessary in gardens of good free loam or alluvial grit, and we have even seen them flowering well in very indifferent soil. A damp place and conditions which conserve moisture are far more necessary, as is proved by the fine growth of Stuartias in a wet season, and the fact that they invariably choose stream-sides and moist places in their own land. The propagation of the Stuartia is difficult and the young plants of slow growth in their early stages. Increase may be by layers of the lower branches, by cuttings, and by seeds, which when imported generally arrive in good condition though they rarely ripen (especially with the American kinds) in this country. With *S. Pseudo-camellia* they ripen more often, and Messrs. Veitch inform us that they have frequently increased this kind from seed gathered in the nursery, though this takes about a year to germinate. Where seed is not available, cuttings of the nearly ripened wood, taken with a heel towards the end of summer or early in autumn, and plunged in sandy soil under a bell-glass, are the most likely to succeed, rooting slowly and with difficulty.

There are five species of Stuartia, two from North America and three from Japan, but only three kinds are in cultivation, two of the Japanese plants—*S. monadelpha* and *S. serrata*—being less known. In growth, habit, and general appearance the group is related to that of Camellia, making part of the great Tea-tribe of the far East. The name Stuartia—sometimes rendered *Stewartia*—was given in honour of John Stuart, Earl of Bute, an early patron of Botany.

S. monadelpha.—One of the Japanese kinds not yet in cultivation, and described as somewhat tender. It is a tall shrub or small tree, with light-green oval leaves which taper sharply at each end and with a downy under side. Flowers smaller than in the other kinds, white with violet anthers, and spreading flatly instead of keeping half-open as in *S. Pseudo-camellia.*

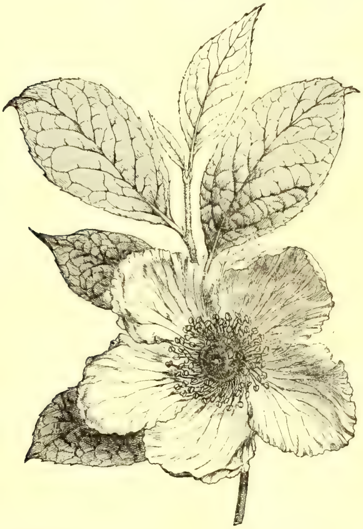
S. pentagyna.—A beautiful summer-flowering shrub and long known in Britain though not common, it is the hardier and more vigorous of the American kinds, of sturdy growth and free and constant in its flowers, which mostly come a little later than in *S. virginica.* It is of erect growth and freely branched from the base, reaching 15 to 20 feet high massed in dense thickets beside the streams and smaller rivers flowing from the Apalachian Mountains in North Carolina and Tennessee. The flowers are fragrant, 3 to 4 inches across, and creamy-white with yellow anthers, coming from the leaf-axils in July and August for about three weeks. In all stages the flowers are beautiful, tinged with pink upon the outside while in bud, and the edges of the petals finely fringed and of such purity as to suggest the name of Shell Flower by their translucent texture. There are usually five or six petals but often more, through the change of some of the many stamens into petal-like organs. The leaves are oval, 5 to 6 inches long, rounded at the base, and finely toothed upon the edges. The plant blooms very freely every year when well-established, and thrives in sandy loam.

S. Pseudo-camellia.—A lovely flowering tree from Japan, where it reaches a height of 50 feet with a girth of 6 feet on the mountains of Hakona and Nikko, at elevations of 2,000 to 3,000 feet. The white flowers are 2 to 3 inches across with a tuft of yellow anthers, but they appear smaller than this from the fact that they remain half-closed like an Abutilon and never open flat as in other kinds of Stuartia. The leaves are thick like those of a

Camellia, smooth, bright green with often a reddish tinge, and finely coloured with gold and crimson in the autumn. A plant now 12 feet high has proved perfectly hardy for years past at Coombe Wood, and was a charming sight in July of this year when our photograph was taken. The stems and branches of old plants are covered with a smooth red bark which peels away in large thin flakes. Syn. *S. japonica* and *S. grandiflora*.

S. virginica.—From the warmer southern states of North America, where it grows in swamps, on river banks, and in shady places from the coast to the foot of the mountains. At its best it is one of the most beautiful of flowering shrubs, though more sensitive to cold and never so vigorous as the other kinds, rarely exceeding 10 feet in height and with a looser habit of growth. In this kind the flowers are finest of all but not quite so abundant, measuring 4 inches across, with pure white shell-like petals and red-stamens in the centre. The petals are smooth at the edges and sometimes more or less streaked with crimson towards the base. Their season is variable, for while in warm places the first flowers open in May, in a cooler district they often wait for July.

B.



Flowering Spray of Stuartia Virginica.

PITCHER-PLANTS IN THE OPEN AIR.

In view of the interesting account of the Darlingtonia given in the last issue of Flora, your readers may be glad to learn that this remarkable plant and others of the hardier Pitcher-plants have now been established for several years in the gardens at Leonardslee, the residence of Sir Edmund Loder, Bart., at Horsham in Sussex. Our plants of Darlingtonia are growing in company with Sarracenia—an allied plant established here in large beds—and fully exposed to the sun, and they thrive well under these conditions. Their pitchers are for the most part filled with insects such as flies, wasps, beetles, and butterflies, which are lured into the hooded pitchers in the way so well described on page 231 of your last issue, and, once engulfed, they hardly ever return. Decay not infrequently sets in among the entrapped mass at the lower part of the tube, and this blackens the base and is apt to destroy the pitchers, unless arrested by placing a small piece of cotton-wool or fine gauze over the mouth. These plants are established in peat and sphagnum resting on the natural soil (clay), and their pitchers are about 15 inches in height.

Side by side with the Darlingtonias there are Sarracenias growing well and flowering profusely, while their seed ripens in quantity. There are numerous plants in various stages of development growing from seed ripened here. These seedlings are somewhat difficult to preserve when small owing to the ease with which they are smothered, but when this is avoided they make good progress and reach a fair size in three years. We have *Sarracenia purpurea* and *S. flava* of the wild kinds, and the hybrid *S. Chelsonii*, a very pretty and distinct red one raised at Chelsea. Two kinds of Drosera, *rotundifolia* and *longifolia*, are also growing freely with these Pitcher-plants.

To establish these plants in the open a warm nook should be chosen, sheltered from wind, and if possible with a trickle of water—as in this case—oozing from the hillside. It must not be too much or the plants may get washed away, nor should it fail in dry weather or the plants will soon perish. From this it will be seen that no haphazard spot will suffice, but that art and nature must combine in this as in many similar instances. In preparing the ground, take off the turf and lay it grass downwards, then get some good peat and sphagnum moss which should be chopped up in equal parts and spread upon the turfy foundations. The plants are put out in this prepared compost and fixed with further peat and sphagnum moss, and the whole slightly shaded till growth has commenced. There are six beds here prepared in this way, the largest of which contains many fine plants each carrying dozens of pitchers, and measures 15 yards by 9. Others are planted in the aquatic portion of the alpine garden, but these do not thrive so well. Mice are great enemies of these plants and should be carefully trapped.

W. A. COOK.

Leonardslee, Horsham.

THE REGELIO-CYCLUS IRIS AND THEIR CULTURE.*

One of the problems which most lovers of hardy plants have tried to solve, is the successful culture of the *Oncocyclus Irises*, and it is a strange fact that, spite of many disappointments with these plants, any one who has once seen their glorious flowers in perfection, tries again and again to find means that may lead to their doing well. In view of the many notes that appear concerning them one would be inclined to believe that we were already in the way to success; yet, although nobody who has studied these plants can deny that we have become more familiar with their wants, every spring that comes round shows that all the difficulties are not yet overcome.

Their near allies, the *Regelia Iris*—among which *Iris Korolkowi* and *vaga* are perhaps the best known—in some degree make up for the disappointment which their relatives too often give us, and when we see the ease with which they grow and flower, we can but hope for the day that will also bring the Cushion Iris within the reach of all. As an enthusiastic lover of this group I may claim to have tried every possible method of meeting their wants, and have been successful in so far as to have at last succeeded in raising a race possessing the vigour that we wish for in the *Oncocyclus* group, as well as their glorious flowers. This new group, which I have called *Regelio-cyclus Iris*, is the outcome of crossing plants of the *Regelia* group —*Iris Korolkowi* and its varieties, *I. Leichtlini*, *I. Suwarowi*, and *I. vaga*

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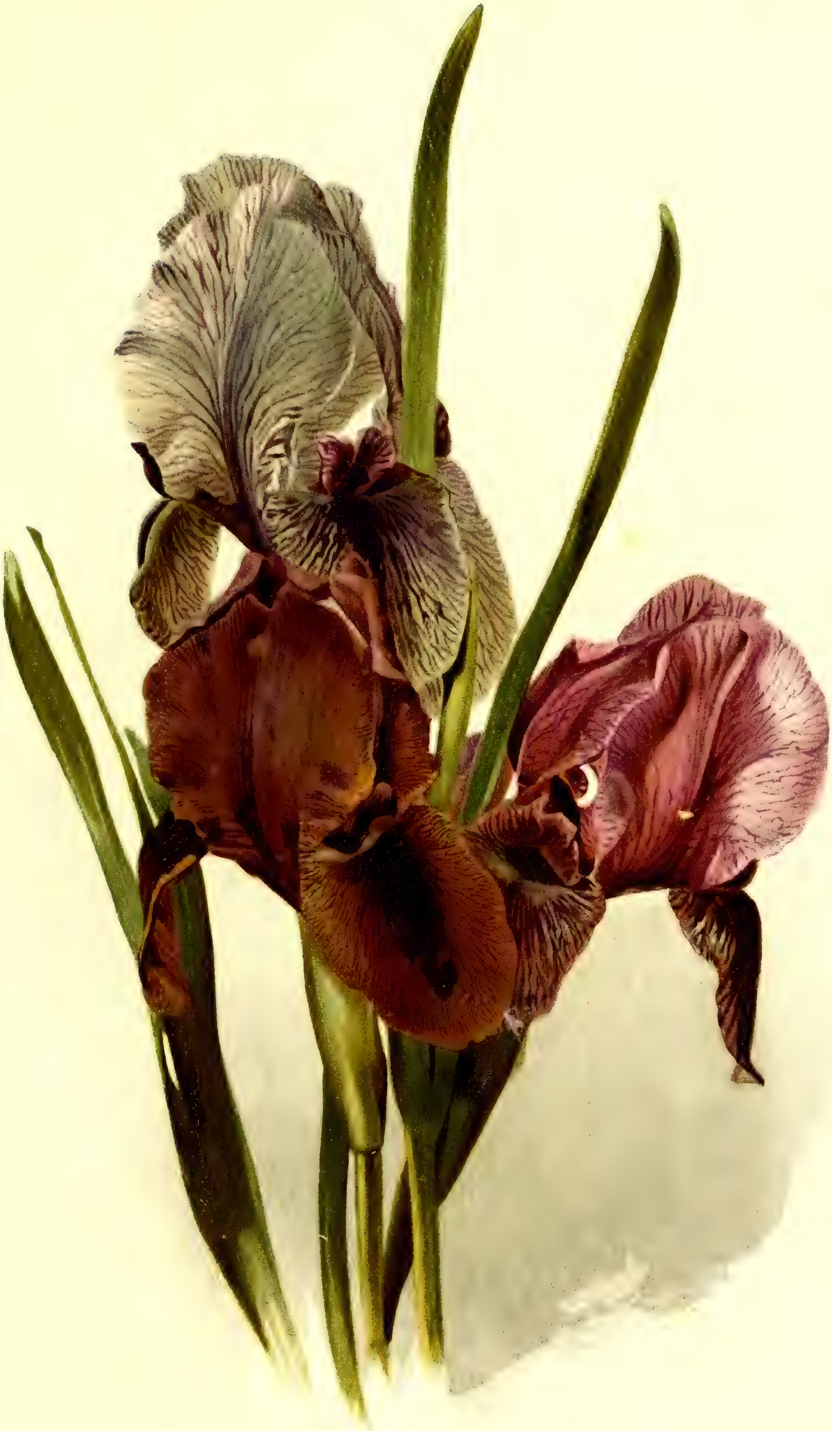
* With coloured plate from a drawing, by H. G. Moon, of flowers sent from Haarlem.



GROUP OF HYBRID IRIS

1 PSYCHE 2 ANDROMACHE 3 [illegible]

—with the best Cushion Irises. In doing this my hope was to counteract the weakly constitution of the pollen parent without losing the advantage of its large flowers. Upon flowering, these seedlings surpassed all my expectations; compared with the weakly *Oncocyclus* class the new gains were of remarkable strong growth. Some of them made leaves more than a foot long, with large flowers on stout stalks mostly over 2 feet high. Many years have since elapsed, and the rhizomes, so far from dwindling as with the Cushion Iris, grow stronger every season and are quite happy under their treatment. A great merit is their readiness to flower, full-sized rhizomes each bearing two or three flower-stalks. This number increases to four and five where undivided clumps are planted, and it is then a picture to see the large flowers towering above the healthy, vigorous foliage on warm, quiet days.

These hybrids embrace many shades of colour which are quite new; on creamy-white or rosy-lilac grounds the standards and falls are delicately netted with brown, deep purplish-red, or grey veins, giving a satin-like appearance. Another merit is that the stout scapes are usually twin-flowered, a second flower unfolding when the first has faded.

One of these seedlings, *Iris Korolkowi venosa* crossed with *Iris atropurpurea*, has developed into a flower of special interest; its colours show a wonderful combination of sombre mahogany-brown tones, veined and netted all over with old gold. The falls have a velvety central blotch of brownish-black, and are edged with a thin band of pale gold. I have called it *Charon*, and it is faithfully represented in the plate as number 2. *Psyche* (No. 1 in the plate) is a very chaste flower, the result of crossing *Iris Korolkowi typica* with *I. iberica van Houttei*, and both parents may be easily recognised in its flowers. The standards and falls are less rounded than in most of the seedlings, showing that *I. Korolkowi* has been one of its parents; the peculiar silvery-white underground it has inherited from *iberica van Houttei.* The netting and veining is purplish-mauve, and the falls have a very conspicuous glossy black blotch in the centre. The third flower in the plate called *Iphigenia* ranks first among the seedlings. Its parents are *Iris Korolkowi concolor* × *iberica* and as was almost to be expected, a first-class flower has been the result. Of perfect shape, its standards are of a warm magenta-rose netted with black veins, while the falls show a peculiar copper-brown colour heavily veined all over with bronze-yellow. Space forbids details of all the new varieties that have been raised during the past ten years. Just a few that were open at the time, were placed before the floral committee of the R.H.S. at the Drill Hall, on 17th May of last year, and were much admired by those present. Considering their readiness to flower, the length of time (from the end of May into July) during which they remain in beauty, and their unique combinations of colour, I do not hesitate to repeat the remark of a well-known amateur that "their value as garden flowers cannot easily be over-estimated."

Culture.—These hybrid Iris like a well-enriched sandy loam, free from artificial manures, though a good dressing of well rotted cow-dung may be added with advantage. The ground should be very deeply worked and so carefully drained as to allow all superfluous water to escape rapidly; this is of the first importance, especially in winter, when the rhizomes are not fully rooted and apt to rot if water becomes stagnant. If the soil is at all heavy or stiff, besides mixing with it a fair amount of sharp silver-sand, each rhizome should be well surrounded with sand, as this will do much to keep them sound. Together with the cow-dung (which should be finely broken) there should be added a few handsful of fine mortar rubbish, as these Iris delight in chalky soils. Further, they must have a warm, sheltered corner of the garden, where they can get the fullest amount of sunshine; this is particularly necessary for them in the spring and early summer, as enabling them to ripen off sufficiently and gather strength for the following year. A capital place for them is at the foot of a south wall. The rhizomes should not be deeply covered, as this tends to weaken the crowns and prevents flowering. If planted about 2 inches deep on heavy soils, and 2½ inches in light, sandy gardens, this will be quite sufficient if only the roots (which some kinds retain, more or less, even when dry) are carefully spread out and not pressed together. These rhizomes emit hairy roots before winter, and it is obvious that the better these roots are spread, the safer the rhizomes will be during the winter.

Planting.—Planting is best done about the end of September, but is possible until the end of October. Though not necessary before the last week of September, it is fatal if deferred until November, as the ground is then too cold for the making of winter roots.

Protection.—These Iris are hardy, but as it happens that in mild autumns some varieties make growth before winter, it will be necessary to have the beds covered with fir-boughs or a thin layer of long straw, to keep off cutting winds and also, on very sandy soils, to prevent the sand from blowing away.

After Flowering.—Unlike other tuberous-rooted Iris, the leaves of this group show signs of decay in summer, but as in our damp climate complete ripening-off is impossible if the roots are left in the ground, they must be lifted, divided, and kept dry and warm until planting time. For rhizomes planted at the proper time (the end of September) the middle of July is a good time for this work. The later the rhizomes are in being planted, the longer they must be left in the ground in the following summer, but the side-shoots should never be allowed to become too long. If these side-crowns are still thick and about an inch long, the roots should be lifted and spread on the ground to dry in the air, but not exposed to sun. After being left thus for a few days to mature, the leaves are cut off to a hand's breadth, the roots somewhat shortened, and the rhizomes then stored away till planting time.

Named Varieties. Other kinds making part of the same series may be briefly described as follows:—*Artemis*, of very strong growth and awarded a first-class certificate by the R.H.S., with large flowers of rich purple and deep violet, with darker blotches; *Aspasia*, standards of reddish violet-purple, falls mahogany-red netted with dark brown; *Antigone*, a fine flower of silvery-grey heavily veined with lilac, granted an award of merit at Westminster; *Calypso*, standards rosy-lilac on a white ground, falls silvery-white with reddish-violet veins; *Eurydice*, a charming flower of deep rosy-lilac, falls netted with deep lilac on a paler ground; *Eurynome*, in shades of reddish-purple and silver-grey; *Hebe*, a very free-flowering variety with well rounded flowers, veined deep violet-blue on silver-grey; *Hecate*, standards rosy-brown, falls densely veined in brownish-grey and finely shaded; *Hera*, of strong growth, colours rich ruby-red with bronze and purple sheen; *Hesperia*, standards suffused with soft rose, falls deeply veined with brown on grey; *Isis*, also granted an award of merit, large flowers of rich ruby-red, with grey and purple tracings; *Medusa*, bluish-white flowers darkly veined and shaded; *Sirona*, small but choice, with dark mauve-purple standards, and short wide falls bearing black blotches on a pale ground; *Thetis*, a strange blending of violet, reddish-brown, and yellow; and *Urania*, standards veined with reddish-lilac on a paler ground, and falls with deep purple on grey, further marked with dark blotches. As cut flowers these Iris are not without value, opening well in water, and retaining their freshness for ten days or more.

C. G. VAN TUBERGEN, Junior.

Haarlem.

THE GREATER TREES OF THE NORTHERN FOREST.—No. 31. THE WYCH ELM (*Ulmus montana*).

In this we have a tree of our own land and one of the utmost dignity and beauty, better seen with us than in any other country, though it occurs also in the northern parts of Europe and Asia. It is so abundant in Scotland and the north-country as to have earned the name of Scotch Elm, and though less common south of the Tweed, fine trees exist in many parts of the country and are remarkable for their stature and picturesque form. The stiff outline and tapering column of the Field Elm gives

Wych Elms at Oak Lodge, Kensington.

place to a massive trunk often of vast girth, breaking into great limbs which are larger and wider spreading and carry a more massive crown of deep green, which usually falls in the autumn a little sooner. The branches are more or less drooping, falling into free and graceful forms rather than the trim roundness of many trees. Though the finest trees grow from 80 to 100 feet or more high, this Elm is in the main not so tall as the Field Elm and is less enduring. Its leaf is a deeper green and in the larger forms about four times larger, with a longer point and more deeply serrated, while the surface is roughly hairy. Even the bark is different, that of the Wych Elm remaining smooth till of a good age and then breaking into flat scales which are never so rough or so thick as in the Field Elm. Huge warty knots are often seen upon the trunk of the Wych Elm, particularly after the loss of a limb or any check to growth, and these swellings not only add to the effect of old trees but are valued by cabinet-makers for their rich marbling. At the same time these faults favour the presence of wood-boring insects and a sort of dry-rot to which the trunk of the Wych Elm is somewhat liable.

Though its Latin name would imply a fondness for high ground, none of the Elms are true mountain trees and the Wych Elm is never happier than when in the deep moist glens and river-dales of the north, where its roots flourish on alluvial soil such as is constantly moist without being overcharged with water. The rocky gorges through which our northern rivers find their way to the sea, offer just these conditions in many parts of their course, and here the Wych Elm is seen in beauty second to none among our native trees. In Yorkshire it reaches its highest point in Britain—1,300 feet, and this moderate record is distanced by the Field Elm which rises to 1,500 feet amid the hills of Derbyshire. In the mountain forests of Switzerland and Germany it attains an elevation of 3,000 feet or a little more, but it is nowhere a high mountain tree, choosing rather the lower slopes and the steep moist banks through which the moisture from above finds its way to the rivers.

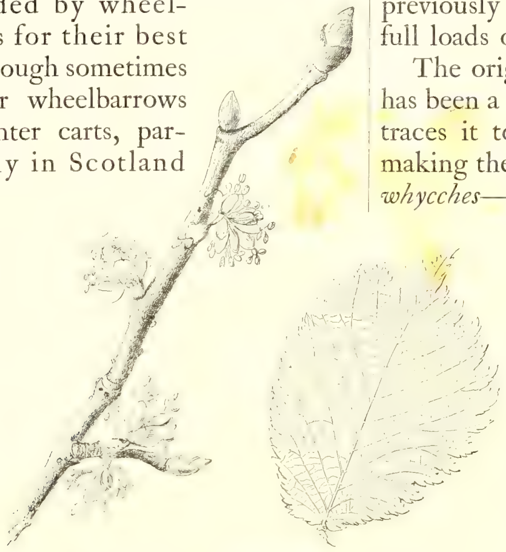
As a Forest Tree. While of fine effect in groups, the Wych Elm is not a tree for mixed woods, where its spreading way of growth makes it such a bad neighbour that in many woodlands it is now cut out without mercy. The tough drooping branches are apt to whip the shoots of slower-growing and more valuable trees, and the falling to one side which is such an element of beauty in old Wych Elms, is out of place in a mixed plantation. The growth of young trees is very rapid, the long annual shoots being so flexible as to resist the fiercest storms and make it one of the best trees for wind-swept shores and exposed places. It is much safer than the Field Elm, thriving well as a hedgerow tree and much less apt to sucker, though, if the roots are injured, suckers sometimes spring up. On poor land it is short-lived and not worth growing and it fails completely on dry gravel or stiff clays, though it grows fairly well upon chalk and limestone. Rich alluvial soils however suit it best and account for its majestic beauty in our parks and beside water, for though not classed as a waterside tree, some of the finest examples of Wych Elms are seen near water, the boughs always weeping in old trees which lean gracefully in all directions when grouped.

Isolated Tree in Park-land.

A number of varieties of this tree have been named, distinguished mainly by slight differences in habit of growth and the size, form, and colour of the leaf. Twenty-six such forms are given in the Kew list, nor does this exhaust the number. Some few are really distinct, and among them the weeping form often seen in our parks and pleasure gardens.

Increase. This is so easy that at one time Wych Elms were raised in large quantities, seed being abundant and the seedlings fit to plant more quickly than almost any other tree. This cheapness however was out of proportion to its use, and smaller stocks are now raised. The trees are fertile from about the thirtieth year and seed freely every second or third season even in Scotland and Ireland, where the Field Elm rarely fruits well. The flowers come in March or April before the leaves, the little brown or reddish-purple clusters being rather pretty upon the bare shoots and more loosely tufted than in the Field Elm. The seeds mature in June and must be gathered at once, for the gentlest puff detaches the leafy green scales when fully ripe, and they drift away in all directions on their broad wings. They should be sown at once, for Elm seeds promptly lose their vitality, and in this consists the one care needed—that of watching seed sown in the open ground at midsummer. Though the young Elms transplant as well as any trees, even to a considerable age, to secure the best results they should be planted early in such good soil as is often found on river-banks, in places too steep for good cultivation. In such ground the growth is luxuriant and the plantations of permanent beauty. The Wych Elm also roots easily from layers, or wherever the trailing branches touch the soil, and increase is also easy from the shoots which break from the trunk at the base of old trees. It was once a common practice to graft the Common Elm upon the Wych Elm, but no one seems to have had any clear idea of the advantage to be gained, and in this case experience seems to have proved its futility.

Wood. The wood of the Wych Elm differs from that of the Field Elm and is in general inferior to it. It is less hard, less heavy, and less durable, with a coarser grain and much less heartwood of a paler colour. Though tough and springy and therefore less ready to splinter, it is more apt to split in the grain especially in drying, and for this reason is avoided by wheelwrights for their best work, though sometimes used for wheelbarrows and lighter carts, particularly in Scotland where the wood is abundant. Its lightness, elasticity, and straight grain, fit it for many uses in carpentry, as flooring, and for the lower parts of vessels. Steamed it becomes increasingly supple, and is then used in boat-building. Cabinet-makers find employment for the finer grains as veneer, especially the twisted and knotty trunks which when fully seasoned give richly streaked and coloured sections. As fuel the wood is poor, burning slowly and with little flame. In parts of Europe where herbage is scarce the leafy shoots are fed to cattle, while coarse ropes are made of the tough inner fibres of the bark. The quantity of timber in old trees is often large. One mentioned by Evelyn as cut down in Staffordshire—once famous for its vast Wych Elms—yielded 97 tons of timber; another, described by White of Selbourne, and which had previously lost its finest limb, gave 8 full loads of sound timber.



Flowering Spray and Leaf of the Wych Elm.

The origin of the name Wych Elm has been a matter of dispute, but Prior traces it to the use of this wood for making the massive chests—*wyches*, or *whycches*—in which winter provisions were stored in olden times, and though a secondary meaning connecting it with folk-lore and protection from witches seems to have grown up around the old name, quotations from old authors prove this to have been its early use. Another old name, that of Witch-hazel, still retained by this tree in some country districts but now given to *Hamamelis*, arose from the similarity between the leaf of the Scotch Elm and that of the Common Hazel.

It is a tree which is not averse to town life, and we have seen some very fine trees of it, in both the natural and the drooping forms, in the London parks and suburban gardens. RUSTICUS.

References.—Evelyn's Silva, vol. 1, p. 115; Loudon, Arboretum, vol. 3, p. 1398; Selby, Forest Trees, p. 124; Mouillefert, Essences Forestière, p. 166; Mathieu, Flore Forestière, p. 302; Laslett, Timber Trees, p. 159; Mathew, Naval Timber and Arboriculture, p. 50; and many notes in Woods and Forests.

CANNAS PAST AND PRESENT.

(*Continued from page* 218.)

Orchid-flowered Cannas. This distinct race, also known as the Italian Cannas, originated at Naples from *C. Mdm. Crozy* crossed with *C. flaccida*—the wild plant of South Carolina. In this way arose the first of the Giant Cannas sent out ten years ago by Messrs. Dammann, a series remarkable for great vigour and flowers 6 to 8 inches across. Their partial failure in some quarters led to adverse criticism, for the great flowers proved flimsy and fleeting, scanty until late in the season, and soon spoiled by wind, rain, or sun, while the plants require a long summer and much sun-heat. They are thus less suited to gardens of the north of Europe though their beauty in a warm country or under glass is now acknowledged and selection and further crossing has improved upon the plants first sent out. They differ widely from the French race, with flowers composed of 6 broadly rounded petals, spreading flatly and differently arranged, and the foliage stouter, broader, and so vigorous that 8 feet is no unusual height for the tallest kinds. The flowers open in the evening and are best on the morning of a still warm day, being apt to scorch as the sun gains strength. There are never many blooms open at once but they maintain a succession, are excellent for distant effect, and so distinct from other Cannas that a practised eye can at once detect the difference. Grown under glass the plants thrive and force readily, and the flowers are rather better for cutting than in the other race. One of the best ways of growing them is in tubs stood in the open all summer, in pans of water; they look handsome beside a sheltered terrace walk, so long as the warm days last. Being sensitive to cold they should be taken inside early and given a little heat, and then go on blooming very finely whereas in the open the flowers would be cut to pieces by the autumn storms even if they opened at all. If used in the open air the plants must have ample space and rich soil, and if it is possible to protect the flowers from the fiercest of the sun they last longer, though to do well the plants need all the sunlight they can get. These giant Cannas are easily wintered, indeed their vigour is such that though sensitive as regards their flowers and foliage, the rhizomes stand the winter in places where the French kinds perish—provided the summer is warm enough for them to become well established. A good many kinds have been sent out by Messrs. Dammann, and others have come from America, where this race does exceedingly well. The greater number bear mottled flowers, but good clear colours are not wanting. As with many hybrids the plants are persistently sterile as seed-bearers, for though the seed-pods swell they contain no germ; at the same time the pollen is sometimes fertile. The newer kinds give flowers more freely and of greater substance and good crosses have been raised between these and certain of the French Cannas; this has given an intermediate strain which promises to be more generally useful, though something of its distinctness has been lost.

Kinds. *Alemannia*, foliage bluish-green, flowers scarlet broadly edged yellow, very large and good under glass; *America*, bronze foliage and crimson flowers with pale yellow stripes; *Atalanta*, grows about 5 feet, with red-bordered leaves and flowers of orange and dull red; *Austria*, one of the first kinds sent out, conspicuous for its clear yellow colour, good in pots; *Burbank*, clear yellow in the way of *Austria*; *Britannia*, a bushy plant of 6 to 8 feet, flowers yellow blotched crimson; *Burgundia*, smaller leaves of grey-green with brown margins, yellow flowers shaped like a Catleya, shaded and spotted with red; *Campania*, 9 to 10 feet high, with immense leaves and yellow flowers paling towards the edges; *Edouard André*, grows 8 feet, with dark foliage and much-branched heads of orange-scarlet; *Hermann Wendland*, 5 to 6 feet and bushy, red and yellow flowers in thick clusters and with a tendency to double; *Italia*, an old kind, very strong, with scarlet flowers edged yellow; *King Humbert*, dwarf for this class, with brownish-green leaves and crimson-scarlet flowers of good substance; *La France*, of bushy growth and dark foliage, flowers scarlet changing to orange-yellow; *Louisiana*, a new American variety, flowers intense red, very large, the darkest of this class, begins to bloom early; *Mrs. Kate Gray*, also from America, of dwarf growth, coming from *C. Mdm. Crozy* crossed with *Italia*. The flowers are more lasting and abundant than in most of this class, borne in solid heads of 20 to 30 and orange-scarlet in colour; leaves ample and very stout, and rhizomes of distinct character. *Pandora*, of medium growth and bushy, pointed purple leaves streaked with green and vermilion flowers streaked and specked with yellow; *Parthénopé*, very strong, reaching 8 feet, flowers orange-red paler towards the middle of the petals; *Pennsylvania*, a good new kind from America, rich red flowers, lasting and of great size; *Pluto*, dark leaves and flowers of deep orange and red; *Prof. Treub*, dark growths of 6 feet, very erect, and red flowers striped salmon-red and shading to lilac-rose at the base; *Rhea*, 6 feet, dark leaves of metallic lustre and small flowers of intense scarlet; *Roma*, grey-green foliage and yellow flowers shaded red; *Sicilia*, flowers chrome-yellow with salmon spots; *Suavia*, foliage-green touched with violet, and flowers of canary-yellow shaded orange.

A few of the older giant Cannas are still grown for their massive effect when grouped upon sheltered lawns or beside water, where they reach a height of 8 to 10 feet in rich soil. Among these are *Auguste Ferrier*, with fine green leaves suggesting a Banana in their luxuriance; *Senator Millaud*, in which the leaves are dark, with clusters of red flowers; and *Madame Joanni Sallier*, a good plant in foliage and in flowers. This was raised about 15 years ago as a cross between *C. liliflora* and one of the Crozy hybrids, and like *liliflora* it has no time of rest but is more or less active the year through, with the result that it blooms at all seasons and is one of the best for winter flowers, deep salmon-red in colour more or less bordered with yellow. For the open in summer and the conservatory in winter, this is still one of the best kinds. B.

IXORA.

For many years these beautiful East-Indian shrubs have suffered neglect, though why this should be is not easy to understand, for few stove plants are more imposing than well-grown Ixoras, standing it may be 6 to 8 feet high and with upwards of two hundred of their heavy flower-trusses. Such plants were commonly seen at the shows of twenty-five years ago, and though the love of such "specimens" has in great measure passed away, there are indications that the Ixora is coming back to favour through its value in decoration, though the smaller plants now in demand seem poor beside the triumphs of a generation since. Their beauty is however of a more useful kind, for while the trusses will last for two or three weeks, increasing in size and in depth of colour, the neat outline of the plants and their small pots fit them for table and room decoration, where they show to advantage under artificial light. Even when cut I have known the trusses to keep in perfect condition for eighteen days, and *Ixora macrothyrsa* (*Duffii*) yields heads of fully 16 inches across which preserve their beauty for nearly five weeks. Added to these merits are their easy culture and the possibility of having them in flower at almost any season including mid-winter, while the certainty that much might be done among the Ixoras by scientific crossing should be a further stimulus to those for whom such work has interest.

Ixora Dixiana. (*Engraved for "Flora."*)
From a photograph in Messrs. H. B. May's Nursery, Edmonton.

Culture. The best soil for Ixoras is composed of equal parts of loam and peat with a sprinkling of sand, and this mixture will do in all stages of growth, crumbling it more finely for small plants and using it rough for those of larger growth. Water should be given freely especially in the growing season, and the plants never left to get dry, though they need far less in winter. Liquid manure may be added once a week until the buds begin to swell. To secure shapely plants attention must be given to stopping, every shoot being pinched at the same time and with due allowance for strong and weak growth as the case may be. If a plant has a few very strong shoots they should be cut two joints below all the others, and this will generally give a good result. Abundant heat and light are essential, and an atmosphere well charged with moisture. Some air may be admitted in very hot weather, but the temperature must never fall below 56 to 60 degrees. When the flower-heads are about three-parts developed the plants should be removed to a light airy house or corridor, and left for a few days to harden in this cooler atmosphere; after this they will be sufficiently firm to serve with safety for all the purposes of indoor decoration. The three enemies of the Ixora are mealy-bug, scale, and red-spider, all of which may be kept under if the plants are freely syringed two or three times a day. Especial care is needed as the flowers develop, for if attacked at this stage it is well-nigh impossible to dislodge the pests from the dense clusters.

Increase. Cuttings may be taken at any season and should consist of three or four joints of healthy wood. If these be cut about half-an-inch below a joint and then split upward, it will greatly aid in rooting. When so prepared they may be inserted somewhat thickly in five-inch pots, put in a warm case with good bottom heat, and kept well watered. As soon as well rooted—usually in about five weeks time—they should be potted off separately into three-inch pots and so grown on, taking care never to over-pot the young plants. Ixoras *Duffii* and *Westii* are two kinds that need extra care, being somewhat shy at rooting, which in their case often takes from ten to twelve weeks.

About 100 species are known, but of the 30 varieties in cultivation by far the greater number are of garden origin. As there is much sameness in the colour of many kinds, I shall recommend only the best and most distinct for all purposes. The few white kinds including *alba* and *Colei* have flowers so fleeting and comparatively ineffective as to possess no market value. The most distinct kinds now grown are as follows:—

Ixora acuminata.—A very distinct kind with white flowers and powerfully scented, but like most of the white-flowered kinds this has little to recommend it. The flowers are very short in the stem, of little substance, and fade so quickly that the plant is of value only for collections.

I. amabilis.—A plant of vigorous growth, compact, and with large trusses; colour a deep salmon shaded with orange.

I. aurantiaca.—A neat and pleasing kind in which the foliage is considerably smaller than in most Ixoras. The flowers are not large, and come in clusters 2 to 4 inches across and of deep orange colour flamed with crimson.

I. coccinea superba.—A form of one of the wild plants from Java, somewhat less vigorous than many of the garden varieties but desirable for its fine colour. Flowers of great substance, with broad thick petals of a rich salmon-red colour.

I. Dixiana.—Also a garden seedling, of vigorous growth, good constitution, and of the easiest culture. Flower-heads 4 to 7 inches in diameter and deep yellow in colour deepening to orange-red.

I. Fraseri.—Another vigorous plant of garden origin and one of the most useful for decoration, its fine colour and the abundance of its rounded trusses (measuring 6 to 8 inches across) rendering it one of the finest of the group. Flowers a fiery salmon shading to crimson-scarlet in the tube.

I. lutea.—A distinct plant in which the leaves are of a paler green and the flowers of a clear yellow. Very free in flower, with trusses measuring 4 to 6 inches across.

I. macrothyrsa.—The great merit of this fine plant is its enormous heads of flower of intense colour. To secure the best results this kind should be grown with a single stem from cuttings taken in summer or early autumn. These make fine plants of 3 to 4 feet high by October of the following year—the month in which it appears at its best. The colour of the flowers is a rich vermilion shaded with crimson, and the bold smooth leaves are often nearly a foot long. Syn. *I. Duffii.*

I. Pilgrimi.—One of the best in its constitution, fine habit, and the freedom with which its bright orange-scarlet clusters, nearly 7 inches in diameter, are produced. It is a garden cross from *Williamsii*, itself a cross, and like that kind will succeed with less heat than most other Ixoras.

I. Prince of Orange.—A garden form of *Ixora stricta* and a good companion to *aurantiaca*, distinct in its rich orange-red colour. Growth free and compact.

I. Westii.—A very distinct garden variety, with flowers of a charming shade of blush-pink, becoming darker with age. A plant of bold and distinct habit with large leaves. To secure good flowers, only three growths should be allowed to a plant in a five-inch pot.

I. Williamsii.—A plant coming near *I. Fraseri* in size and habit, but distinct in its pleasing shade of reddish-salmon. A general favourite with market growers, for its good constitution, vigour, and endurance in a lower temperature than is enjoyed by most other Ixoras. G. A. BROWN.

STRELITZIA (*Bird of Paradise Flower*).

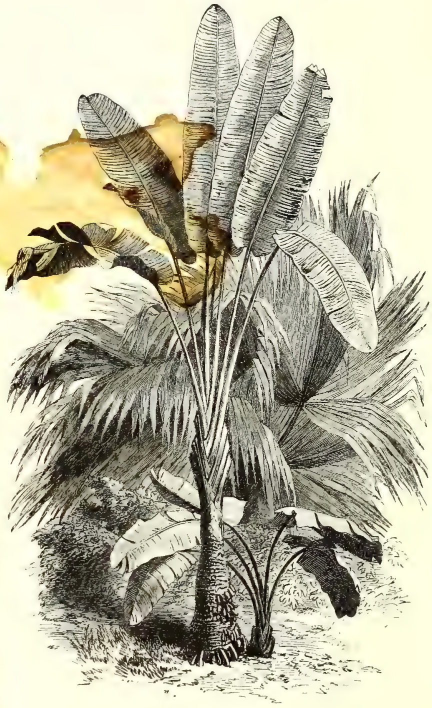
Handsome and distinct sub-tropical plants in five species, allied to the Banana, the Canna, and the Traveller's Tree of Madagascar (*Ravenala*), and like them fine in leaf and with the charm of large flowers of singular beauty. The name Strelitzia was given by Sir Joseph Banks in honour of Queen Charlotte of Mecklemburg-Strelitz, wife of George III., to whom the gardens at Kew owed much in 1773, the year in which *Strelitzia reginæ*—the first-known kind—was introduced. The tall kinds are scarce, being suited only to a lofty house where 20 feet or more of growth is not out of place; or to the warmer parts of the south of Europe and Algeria, where good use is made of them in the open air, as in the gardens at Monte Carlo which have a magnificent growth of *Strelitzia Augusta* in the partial shade of old Olive trees. With us, however, full-grown plants of these kinds are seldom seen save in botanical gardens, though young ones are sometimes used for summer-gardening in the warmest parts of the south and west. The stemless kinds such as *Strelitzia reginæ* are better suited for general cultivation, thriving in fairly cool houses of moderate size. Established pot-plants may indeed be stood in the open air throughout the summer and will be better for all the sun that they can get, flowering freely early in the spring in an intermediate house where the temperature does not fall much below 50° in winter. They will even do well in a house from which frost is barely excluded, along with Azaleas, Camellias, and Agapanthus, while on the Riviera the cold winter nights seldom do any harm unless the plants are exposed to keen white frost and early sunlight. Owing to their great mass of roots, large pots are required if the plants are to do well, and in these they may remain for years with an annual top-dressing of rich soil. But they do best planted out under glass, growing rapidly when the thick fleshy roots have ample space and are well nourished, for the Strelitzias are gross feeders.

Culture.—Strelitzias thrive in soil, composed of turfy loam and decayed manure, with a little sand and ample drainage to guard against stagnant moisture while the plants are being heavily watered during full growth. This soil mixture should be prepared some while in advance, and, when once the plants are well established, southern growers use strong liquid manures in the growing season and while the plants are in flower. During autumn and winter little water is needed, especially if the plants are grown cool. They thrive in full sunlight and should have ventilation whenever possible. Though little subject to insect pests the Strelitzias are sometimes attacked by scale, but this is easily removed by sponging with insecticide. Increase is mostly by seed for the tall kinds and root-division for *S. reginæ*, *S. parvifolia*, and their forms. This division should follow flowering and requires care in disentangling the brittle roots, and gentle bottom-heat and careful watering until the plants are again established. Even with every care it is often two or three years before the plants flower again with any freedom, after a disturbance of this kind. Seeds should be sown singly in small pots after soaking for forty-eight hours in warm water; placed in moist bottom-heat under glass they germinate in three or four weeks but at first grow rather slowly.

This monograph by M. van Den Heede of Lille, is translated (with some additions) from the journal of the National Horticultural Society of France.

S. Augusta.—A plant of noble aspect when well grown, reaching a height of fully 20 feet and rivalling the Banana in the amplitude of its leaves, 2 to 4 feet long and half as wide, upon stout stems of 4 to 6 feet. These are freely put forth all the way up by a tree-like trunk, the flower-spikes making their appearance in the lower leaf-axils and measuring 2 to 3 feet in length upon a very short stem. The flowers are at first folded within a large canoe-shaped spathe a foot or more long, of deep purple colour, and often containing a sweet transparent liquid which flows from the flowers. These are similar in structure to others of the genus, but are larger and wholly white. The plant requires a warmer temperature than *S. reginæ*. It was found by Thunberg near the Pisang River, South Africa, and first flowered at Ghent in 1854.

S. Nicolai.—A plant with luxuriant leaves spread fan-wise and a palm-like stem of fine form in large houses, where it has been known to reach a height of nearly 30 feet, proving the most vigorous of the family. It is scarce in this country but commoner upon the continent, where it is so robust as to be used for summer gardening in favoured places. In appearance it is so like *S. Augusta* that for many years it passed as a form of it, differing only in the shape of the leaves, which are somewhat blunt at the base in this kind whereas they are heart-shaped in *Augusta*. It flowered in Europe for the first time in 1858 in the Botanic Gardens of St. Petersburg and its handsome flowers of blue and creamy-white proved it to be quite a distinct kind. In this they are largest of all, and suggestive in their quaintly beautiful outline of some huge tropical butterfly in the act of alighting. Beside being larger they differ somewhat in shape from the flowers of *S. Augusta*, and are produced in succession over a long period. The green and purple spathe is also very large (12 to 18 inches) and fills with a gummy fluid as the flowers expand. The noble leaves are nearly 6 feet long and over 2 feet wide, forming a leafy crown of great beauty. The name *Nicolai* was given in honour of Prince Nicholas of Russia.



YOUNG PLANT OF STRELITZIA NICOLAI.

S. parvifolia.—Though separated from *S. reginæ* this plant is identical with it in all save the form of its leaves, which are so small as to show little more than the stalks, though they vary in size and shape through several varieties. *Augustifolia* is a form in which, though much smaller and narrower than in *reginæ*, the leaves are still fairly apparent. In *parvifolia* itself the blade is so much reduced as to be only a few inches long and very narrow; while *parvifolia juncea* is an extreme stage in which the leaf-blade is either entirely absent or reduced to a tiny vestige at the tip of the long rush-like stems of 3 to 4 feet, visible when new growths are first thrown up but dropping as they become older. These forms are all highly interesting, require rather less heat than other kinds, and are of quaint effect when studded with flowers.

S. Quensoni.—A very rare plant which flowered many years ago in France, but of which nothing appears to have been heard of late years. According to a description given in vol. 10 of the *Illustration Horticole*, the plant is of imposing stature and ample foliage, coming near *Augusta* and *Nicolai* in its general character but differing from them both in that from the top of a single stemless spathe three secondary spathes of ample dimensions make their appearance, developing in succession from one another; these spathes are black, covered with a pale bloom, and are heavily charged with honey. Each of these secondary spathes yield three to five large ivory-white flowers, shaded towards the base with rosy-violet, and with two segments of a fine sky-blue tint.

S. reginæ.—The best known and most useful kind, easily flowered, with a long season of beauty, and of a size suited to small houses and conservatories. The plant is stemless with a handsome tuft of oval leaves standing 4 to 5 feet high upon long stout stems, their colour a bluish or grey-green, with a smooth surface and leathery texture. The true season of flower is early spring, but a strong plant grown constantly in one temperature is seldom out of flower, the bloom often continuing through several months though the number of flowers at one time is not great. Under different treatment, as when grown in the open during summer and in a cool house at other times, the season of beauty is shorter and more defined, old plants grown in this way sometimes making upwards of fifty spikes at once in March or April. Even plants in small pots seldom fail to flower, though the older and stouter the plant the finer is the display of orange and blue (or purple) flowers, so unlike any others in shape and structure as to have earned such fanciful names as Bird's Tongue and Bird of Paradise Flower. The blooms last fresh for a long time even when cut, and the same sheath will keep on producing them for weeks. In South Africa the plants seed freely and the seeds are eaten by the Kaffirs. Under glass they bear seed if fertilised, the pollen being applied after the honey in the nectary has been removed and while the plant is maintained in a high temperature. A good many seedlings have been raised and several distinct varieties have resulted, among the best of which are:—

Varieties. A dwarf form raised in France and known as *pumila* or *humilis* from its dwarf habit, with a great number of leaves and flowers that are a little smaller and somewhat paler in colour. *Ovata* differs from *reginæ* in its more vigorous growth and flowers of a slightly different shape; the broad-bladed glaucous leaves often stand more than 6 feet high. A Belgian seedling raised early in the last century was named *rutilans* from the brilliance of its flowers in which the orange becomes scarlet; if still in existence, this plant is exceedingly rare. The form *citrina*, brought to Kew from South Africa nearly twenty years ago by Mr. Watson, is of dwarfer habit and is very distinct in the lemon-yellow and pale blue of its flowers. This wild form of the plant would seem to have also arisen under cultivation in var. *flava* and var. *Lemoinieri*, in each of which the deep orange of the type is replaced by clear yellow. The last named is a Belgian seedling raised near Lille and still grown in that town, where the original plant has remained in the same hands for many years. Varieties of minor interest are *farinosa*, in which the leaves are covered with a handsome greyish bloom which, like that upon hothouse grapes, is removed at a touch; and *prolifera*, in which two spathes are produced upon the same stem, while the leaves are shorter in the blade and longer in the stem than in the common form.

SOME NEW NEPENTHES, WITH A COLOURED PLATE OF N. SANDERIANA.*

THESE quaintly beautiful plants of which we have recently published a detailed account (vol. 2, pp. 65 and 111) have of late received much attention from some of our leading botanists with a view to a better understanding of their complicated life-processes. Chemical analysis has shed considerable light upon the function of the urns, and goes to show that the fluid which they contain undergoes important changes between the time of its first secretion and the withering of the mature pitcher. There is still much to be cleared up in researches so delicate and complicated, and which it is impossible to follow under the best conditions—that of studying the plants in their wild state. One of the first authorities upon Nepenthes has undertaken in the near future to give our readers the results of this work, so for the moment we content ourselves with offering a finely-drawn plate of a newly-imported species, with notes upon such new kinds as have appeared within recent months.

This new kind has been collected in Sumatra for Mr. Sander of St. Albans, after whom it is named. It comes near to *N. Rafflesiana* in the shape and size of its urns, though these are more brilliant in colouring and the plant of more compact growth. The pitcher is shown life-size, with broad boldly-fringed wings which are more finely coloured than the body of the pitcher itself. *N. ventricosa*, a second newly-imported species from the Philippines is remarkable in the shape of its pitchers, which, from a broad base and a wide mouth, contract to a narrow waist. These singular urns are about 5 inches long and of stout leathery texture, with a smooth surface and no wings, and their colour a clear pale green varied only by the rose-coloured rim. The lid is rather small as compared with the mouth of the pitcher, evenly rounded, and well tilted upwards. A third new species, recently named and described by Mr. W. B. Hemsley of Kew, is *N. Macfarlanei* from the Malay Peninsula, where it is found growing at an elevation of 5,000 feet. Its pitchers are remarkable for their prominent honey-glands, mingled with stiff bristly hairs upon the under-side of the lid. As so often happens in Nepenthes the perfect pitchers are of two sorts, those first formed being small, with very narrow unfringed wings and a simple narrow rim; while those formed on the upper part of the plant —which climbs to a height of 15 feet —are much larger, measuring at times as much as 12 inches from their base of the tube to the tip of the erect-standing lid, with rims half an inch wide and lids 2 inches across, and beset with bristles on the under side. So far this species seems to be unknown in this country, save in a dried state.

The already bewildering choice of hybrid Nepenthes has been added to by various named seedlings, the most important in this country being *Nepenthes F. W. Moore*, shown by Messrs. Veitch of Chelsea, and resulting from the same cross (*N. mixta* × *N. Dicksoniana*) which gave the handsome new

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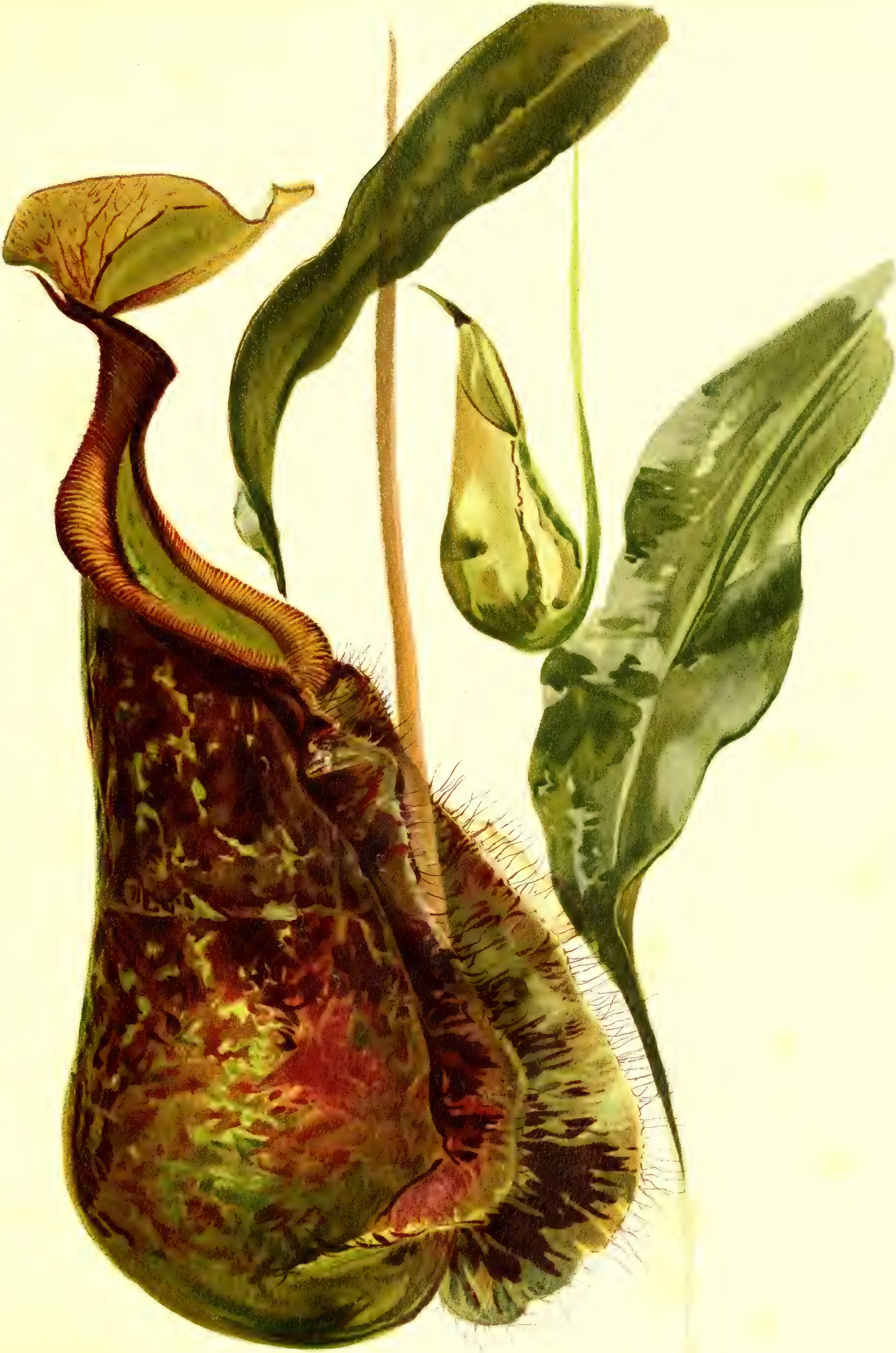
* From a drawing by H. G. Moon in the Nurseries, St. Albans.



NEPENTHES [illegible]

kinds described on page 68 of volume 2, *N. Sir W. T. Thiselton-Dyer* and *N. picturata*. The pitchers are rounded and globular, 5 to 6 inches in length and green in colour, with narrow coarsely-fringed wings and a wavy rim of deep red-brown colour. It received a first-class certificate from the Royal Horticultural Society in October of last year. Several new hybrids shown by Dr. Fournier of Neuilly have received awards from the Horticultural Society of France, one of which at least would appear to be a very interesting plant. Disappointed in crossing *N. Northiana* and *N. Curtisi*, which only gave again the *N. mixta* and its form *sanguinea* obtained many years previously by Messrs. Veitch, *Northiana* was then crossed with *mixta* itself, and the seedlings from this inbreeding proved so varied that without such complete proofs their common origin could never have been suspected. The most remarkable of these is *N. Marie-Louisiana*, whose milky-white translucent pitchers are said to more nearly approach those of the famous *N. Burbidgei* with its pure-white crimson-speckled urns, than any other known kind. In this kind the white surface is also faintly speckled with carmine, but the pitchers would seem almost colourless save for the dark reddish-purple spots on the inside which show through the semi-transparent tissues. The rim of the pitcher is narrow and yellowish-white lightly striped with red, as is also the under side of the lid, while the wings are narrow and fringed with short hairs.

Others of this series more nearly approach *N. Northiana*. In *N. Simonei* the pitchers are paler than in that species, with a wide undulating rim of greenish-yellow faintly striped with red. The wings are long and wide, undulating towards the base of the pitcher, and fringed with long hairs set closely and often branched as in *N. lanata*. Its vigour suggests *mixta* rather than *Northiana*, which again is the prevailing influence in *N. Fourneri*, with its large red urns speckled with reddish-purple, and broad wings fringed with thickly-set hairs. The rim of the pitcher is very slightly waved and its ruddy surface streaked with dark brown. *N. Gauteri* only differs from the last in its darker and uniform red colour, the surface sparingly spotted with brown towards the neck, where the wide mouth is guarded by a blackish-brown rim. The fifth variety deemed worthy of a certificate was *N. Mercieri*, with small greenish urns lightly freckled with carmine in the lower part, these specks so increasing towards the neck as to appear like an irregular dark band. Wings wide and undulating ; rim narrow and greenish, faintly striped with red ; and lid also greenish, faintly speckled with carmine on the upper surface.

While referring to *N. Northiana* mention may be made of its fine form *pulchra*, well grown by M. Desloges of Château de Remilly, Ardennes, France. It is more vigorous than the parent and remarkable in its rich crimson-shaded pitchers, among the most beautiful of the genus. The rim is deeply folded back and finely striped with crimson on golden-brown, while the ample lid closely overhangs the mouth of the tube.

LAPEYROUSIA.

It is always a gain to light upon plants that are beautiful and easily grown, and in this little genus we have several which have these merits and are new to most gardeners of the present day. They form a very pretty group of bulbous plants from the Cape and south-tropical Africa, embracing more than thirty kinds, of which perhaps only six or seven have been introduced, and these are now mostly forgotten. They are nearly allied to Freesia, with flowers similar in structure, composed of six segments, three of which are larger than the rest, and in many kinds they are arranged upon the flower-stem in the same one-sided or zigzag way. They have the same narrow sword-shaped leaf, but while the bulbs of Freesia are cone-shaped those of Lapeyrousia are oval or rounded and enclosed in a matted tunic, and their flowers are variously coloured in blue or red, 1 to 2 inches across, and (save in one kind) without fragrance. They are named in honour of Jean de la Peyrouse, a distinguished French voyager, one section distinguished by its scanty foliage (reduced to one or two basal leaves only) having been separated by some authorities under the name *Ovieda*.

One of the most beautiful and quite the most familiar of these pretty little plants is *Lapeyrousia cruenta*, better known as Anomatheca, a dainty little plant in which the flowers are nearly an inch across and of a soft brilliant carmine touched with darker blotches, carried upon tough little stems of about 6 inches and succeeding one another during several weeks. As an edging or border plant for light sandy soils nothing could be more beautiful, either in full sunlight or partial shade, where the flowers come later but are rich in colour. In warm southern gardens, especially near the sea, the little bulbs are quite hardy and come up year after year on dry gravelly banks or rockwork, where they can grow undisturbed. In winter a layer of litter or dry leaves, with a tilted pane of glass over the whole, is an added protection, and with this care they seldom fail to pass the winter. In heavier ground they should be used in a prepared border and taken up after flowering, and in this way may be kept safely in a dry place till the following March. The season of flower varies a little with the time of planting and the spot selected for them, for while bulbs which have grown undisturbed or been started early will often flower in June, others in colder places or when started late will bloom in July or August. In this way one may have a succession of flowers in the open or under glass, for all the kinds grow well in pots and are very gay for the greenhouse during August and September, while nothing brighter could be used for the front line of a window-box than a chain of *L. cruenta*. After flowering, if under glass, the water should be gradually withheld as the leaves wither, and the bulbs taken up or put to rest completely by the end of October. Seed ripens readily, and, if sown early and grown on in gentle heat, the seedlings will flower the same autumn, though with *cruenta* the bulbs are so cheap and increase so rapidly that this trouble is hardly necessary. After *cruenta*, *L. juncea* and *L. grandiflora* are the best known, the last a very handsome plant fully as fine in colour as *cruenta* and now offered by some of the Dutch houses, and doubtless to be had also through our own trade firms. The following species have been in cultivation :—

L. compressa.—An old kind from the Cape, with broad blunt leaves of greyish-green colour and curled at the edges, and spikes of bluish-purple flowers in September upon branching stems of 9 inches. Syn. *L. anceps.*

L. corymbosa.—Another very old kind now almost unknown spite of its fine blue flowers an inch across, with a starry white patch prettily outlined in black just at the throat. These flowers appear in June as a compact flat cluster on stems of 6 to 10 inches, the foliage consisting of a solitary sword-shaped leaf. Syn. *Anomatheca ovieda.*

L. cruenta.—The best known of the group, under its old name of *Anomatheca cruenta.* Leaf narrow and erect, 6 to 9 inches high ; flowers soft bright crimson with darker blotches.

L. fissifolia.—An old plant now very scarce, coming near *corymbosa* but with rosy or violet flowers, very narrow in the tube, and 2 inches long. The leaves measure about 6 inches, tapering finely, and, unlike others of the genus, the flowers are fragrant.

L. grandiflora.—A new species brought from Delagoa Bay, with a long season of beauty, and flowering finely in the open air during late summer. Flowers 2 inches across in sprays of four to ten, bright red in colour with darker spots at the base of each of the three smaller segments, and rosy-white in the throat. Leaves grasslike, 6 to 12 inches long, and small rounded bulbs spreading by means of stolons. Coming from a warmer part of S. Africa, this species is somewhat tender and should be wintered in a greenhouse or frame.

L. juncea.—A plant with a habit so like a Gladiolus as to have been classed with them as *G. junceus.* It is profuse in its bright pink or pale red flowers, with darker spots at the base of the segments. Leaf strap-shaped and very narrow. An old kind brought from the Cape in 1791, and now rare, though fully hardy in southern gardens.

L. rosea.—Fine rosy flowers with a richly glowing centre, appearing in early summer.

B.

Flower-Spray of the Vranja Quince.
(*Engraved for "Flora."*)

THE NEW SERVIAN QUINCES.

We are pleased to give some further account of these new fruits, briefly noticed on page 380 of our second volume. These giant Quinces have been grown for generations amid the Balkan Mountains in their native districts of Lescovac and Vranja, but only of late have their merits become known to the outer world. Both of these kinds are now growing and have fruited with Mr. Chambers of Grayswood Hill, Haslemere, who believes that they will prove exceedingly useful when fully established. In the part of Servia from which these trees have come the winter is far more severe than with us, and their proved hardiness in cold inland districts of the north of France and central Germany should reassure any who from doubts as to their resistance have shrunk from planting these southern Quinces. Writing from Nancy, M. Lemoine tells us that with him both kinds do well, growing strongly and yielding large fruits which ripen fully and are distinct from other kinds, being more suggestive of an Apple, and so much more fruity than is common with Quinces as to be not unpleasant even when raw.

The Bereczki or Vranja Quince, the flowers of which are shown in our engraving, is a tree of strong growth with erect habit and large leaves, and begins to yield while quite small. The fruits are very large and long in shape, remarkable for their clear shining skin, delightful fragrance, and fine golden colour. The flesh is said to be softer than in most Quinces, juicy, and of fine flavour, yielding a great quantity of good jelly though this leaves something to be desired in clearness and in colour. Last spring the Vranja Quince failed to set its flowers at Grayswood, but it ripened several fruits in the previous autumn. It is also grown at Kew, but so far has not fruited there.

The Lescovac Quince, named after the Servian town of that name, is now ripening its fruit in Surrey. It is a tree of strong growth also, but more spreading in its habit, with small and very dark green leaves. Though very large the fruit is of refined flavour, with a soft downy skin, and of a decided apple-shape. Though perhaps less juicy, it is even better than the Vranja for marmalade and preserve, its jelly coming very clear and of fine colour. B.

SARRACENIAS IN AMERICA.

Mr. F. W. Burbidge sends us the following note as to these strangely interesting plants, from the pen of Prof. Macfarlane, the first American authority upon Sarracenia :—

The literature in regard to American Sarracenias is not abundant, and the only man so far as I am aware, who has done anything important in the way of hybridising is Mr. Oliver, who, while in the Washington Botanic Garden, raised numerous hybrids between the different species, one or two of which I have received from him, including the cross we know under the name of *S. Courtii.* There is interesting matter concerning Sarracenia in Bailey's *Cyclopedia of American Horticulture.*

In respect of Sarracenias I am glad to say that my trip has been most successful. I have been able to locate *S. Catesbæi*, which often occurs in enormous quantity and apparently wholly west of the Alabama River. In one region, near Ocean Springs, a continuous growth of it extended for about 7 miles, truly a wonderful sight. I have also got many new localities for the other new species, but most remarkable of all was the growth of *S. Drummondii* between Mobile and Flomaton, great masses of it intermixed with equal quantities of *S. psittacina*, and occasionally *S. flava*, *S. rubra*, and a probable new Drosera, covering thousands of acres. Here also I secured numerous hybrids between *S. Drummondii* and *S. flava*, magnificent stately plants, examples of which we now have in cultivation. At another spot in north central Florida, we found many hybrids between *S. purpurea* and *S. flava*, quite resembling the artificial hybrid already known between these. I renewed my acquaintance also with some of the rich localities for *S. flava*, particularly that near Summerville, South Carolina, where masses of it extend for miles, dotting the Savannahs with great clumps of the pale greenish-yellow upright pitchers.

THE FORESTS OF THE ALPS OF DAUPHINY.

The mountains nearest to Lyons are those of Dauphiny, lying in the direction of Grenoble, and are met even before the town is reached, as grand ridges of limestone rocks rising to a height of 6,000 feet, continuing the Alps of Jura, and embracing such resorts as the Grande Chartreuse, the Goulets, and Pont-en-Royans. Over against this first crest of the Alps, upon the far side of the Valley of Graisivaudan, where the Isère rushes foaming from its rock-bound course in Tarentaise and Maurienne, stand the huge granite masses of Belledonne, Taillefer, and Les Sept Saux, which rise to nearly 10,000 feet and carry the first alpine glaciers.

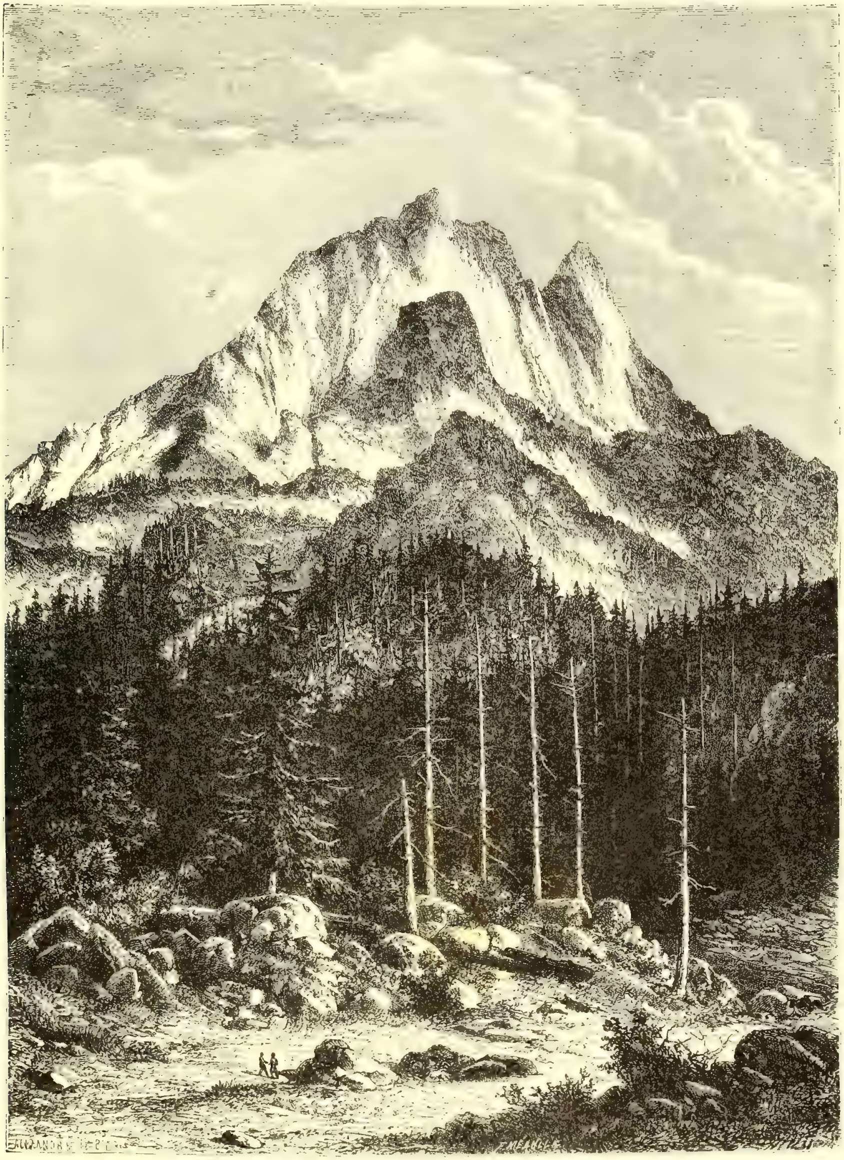
The forests at the foot or covering the flanks of these mountains are formed of various kinds of trees. The common Oaks (*Quercus pedunculatus* and *sessiliflora*) form extensive woods in the valleys and upon the lower slopes. Both diminish rapidly in growth as they ascend, until the last Oaks, at a height of some 4,500 feet, are but stunted bushes. The Beech is plentiful upon the slopes facing north, either by itself in dense forests, or mingled picturesquely with the Pine Trees. Other forest trees commonly found with the Oak and the Beech are the Ash, the Mountain Elm, the Limes (*Tilia platyphyllos*, *parvifolia*, and *intermedia*), the last a cross between the two first; the Birch, the Alder (*Alnus glutinosa* and *incana*), which follow the alluvial soil beside the mountain torrents, along with Poplars and Willows. Of smaller growth is the Hornbeam, which, mixed with Oaks, is found in considerable quantity, its wood yielding the best of fuel, while upon the lighter granitic soils the Chestnut grows in open grassy spots. The Walnut is found principally as a cultivated tree up to nearly 3,000 feet. The great Maples (*Acer platanoides*, *pseudo-Platanus*, and *opulifolium*) are seen here and there up to about 3,600 feet. The woods are adorned in spring and autumn by the flowers and berries of the Mountain Ash, the White Beam Tree, and its ally *Pyrus scandica*. These three forms of Pyrus extend beyond the tree-limit, maintaining their growth as low shrubs, mingling with the rosy flower-clusters and large crimson fruits of the Bastard Quince (*Pyrus Chamæmespilus*), *Alnus viridis*, and the mountain Rhododendrons and Cotoneasters.

Two sorts of Conifers only—the Silver Fir and the Norway Spruce—form forests like those of Vercors and the mountains of Allevard—the last refuge of bears in France. The Norway Spruce is plentiful in the forests of the Grande Chartreuse and Savoy, whereas the Pines covering Chaurousse, Taillefer, and Belledonne are mostly the Silver Fir. Next in importance is the Scotch Fir, which occurs in isolated groups and masses here and there upon the poor and sandy soils of the lower slopes, but poor as compared with those of Scotland and of Riga, which are now used in all the newer plantations, for their superior growth and stature. The Larch is also found singly or in isolated groups, with the Swiss Stone Pine and the Mountain Pine in like proportion.

The scene changes, however, if, leaving the Valley of Graisivaudan, we follow the Romanche towards the south-east as far as La Grave. By degrees the Beech, and the Scotch and Spruce Firs, give place first to the Larch, which prevails in the forest of Fréaux before reaching La Grave. During summer this forest clothes with its lovely tender green the rocky slopes from the bottom of the valley and the banks of the Romanche to the brink of the great Glacier de Mont de Laus, which caps the mountain and dissolves in cascades and fierce torrents, rushing headlong by every valley, clothed throughout with forest trees. But it is during September and October, when the first chills fall from the icy heights, that one should see the variations of colour through which this vast belt of vegetation passes, from the glowing copper and gleaming crimsons of the upper slopes to the unchanged green of the lower levels. The panorama is as one vast palette upon which autumn has lavished all her colours.

On leaving the forest of Fréaux the Silver Fir and the Spruce become rarer, their place being taken by the Larch, which, upon the far side of the Col du Lautaret, as one descends the banks of the Gruisane, is mingled with *Pinus uncinata*. This gains in importance until its true home is reached in the Valley of the Durance. It forms a tall straight stem with a close rising crown of verdure, and its timber is much valued. Greedy of sunlight—as are many Pine trees—it abounds in this sunny corner of the Alps, and with it appear various sun-loving shrubs in the Savin *Prunus brigantiaca* and others characteristic at once of alpine and southern vegetation. The Valley of Ubaye, branching from that of the Durance towards the south-east, extends to the Maritime Alps and the frontier of Italy. Amid these arid heights, unfavourable to the growth of grass or grain crops, the peasants are forced to seek food for their flocks in the forests. Early in the autumn the branches of the Willows, Poplars, Elms, Ash, and Hornbeam, are cut with their foliage and dried to serve as fodder during winter. This, beside weakening the trees, destroys the seed which would renew them, with the result that little by little all growth perish. A country formerly rich has been ruined by a long series of wars during the Middle Ages and the subsequent improvidence of the people. Once destroyed, these natural riches are slow to return, spite of the efforts made towards replanting by the forest administration, and much that has been done to check loss and ravage by the mountain torrents.

The Ubaye flows in a narrow valley between mountains of an average height of 10,000 feet. The vine covers the sunniest slopes to a height of 3,000 feet, and the Oak is found up to 4,600 feet, but at that height only as low, isolated tufts in the most sheltered corners. On mounting the Ubaye the first important forests are those at Lauzet (2,900 feet), where the slopes



Mountain Forests of the South of France.

facing south are clothed with the Scotch Fir, while the Larch, the Spruce, and the Silver Fir hold their own upon the colder lands turned to the north. It is only on passing the limit of 5,400 feet that the trees mingle, regardless of aspect, reaching thence to a height of 7,500 feet as low brushwood, which is closely cropped each autumn, and in its stunted growth imparts a strange character to the landscape. The Larch, forming fully nine-tenths of this woodland, is cut each year from base to summit, shooting again from the trunk each summer in short branches of even length from top to bottom, giving the trees the singular appearance of a verdant pillar crowned at the top with a few natural branches. For the beauty and size of its trees the finest forest of Larches is that of Lauzon, crowning the gorges of the Reisolle over against the village of Saint-Paul-de-Vàrs. Other forests but little inferior are those of Saint-Vincent, of Lavercy, of Gimette, of Gache, and especially of Lauzet, with its crowning belt of beautiful Swiss Stone Pine. This tree (*Pinus cembra*), hardier than the Larch, grows to the extreme of the tree-limit, forming the first forest belt below the snow-line. Unhappily its growth is very slow, and being subject to the inroads of man from the valleys, and storm and avalanche from above, its extent is yearly diminishing. It will be long indeed before new plantations, however cared for, can restore the rare beauty which is thus being lost.

In our rapid survey of the Alps from north-west to south-east we have seen how various trees succeed one another according to prevailing conditions. First the Oak, followed upon higher ground by the Beech, the Silver Fir, and the Spruce as the prevailing trees; close at hand follows the Larch, attended in its turn by the Mountain Pine, growing in sparser woods than its kindred, and much mixed with Larch in the valley of the Durance and its tributaries of the High Alps. Lastly, in the southern part of this region, where the mountains merge into Provence with its sunny skies and genial breezes, the Alpine Stone Pine covers a considerable area between 6,500 and 8,000 feet. A like succession is to be found when passing from the Bernese Oberland to Southern Valais; and to further strengthen the resemblance, the Beech is superseded as completely in the one case as in the other, disappearing suddenly, and that far below the elevation at which it normally prospers. M. Christ considers that its disappearance in the Valais is due to the dryness of the atmosphere, and no doubt the same cause operates on the French side, in the valleys of La Blanche, La Bleone, and those of the Verdon and the Var. With the Beech there also disappear—again as in the Valais—all trace of the Holly and the Laburnum.

Ye mountain fastnesses, I hail with reverence and with love thy sombre mantles of Pine forest, thy varying robes of dusky Beech and tender Larch, thy cloistered vistas of stately trunks and dim arches of waving green. I delight to lose myself in those verdant labyrinths, inhaling the pure air of their mountain retreat, and awed by the calm stillness that reigns in those green solitudes, unbroken save when the myriad branches are stirred with vague murmurs which seem to whisper of the sea.

Lyon. FRANÇISQUE MOREL.

FLORA
AND SYLVA.

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THE NEW GARDEN AT BUCKINGHAM PALACE.

Those interested in garden design and the improvement of London have now had an opportunity of judging the effect of this new garden during the present flower season, and will perhaps have seen reason to think that it was a mistake to mutilate the park for the sake of extending the excessive area devoted to the bedding out of tender plants in the London parks. We have enough in the Regent's and Hyde parks, without an even less interesting spread of the same thing in front of the palace. It was surely an insufficient reason for cutting off a piece of the park. It was easy to get the space necessary for the road without stealing away some of the charms of the park. The flower-gardening can be mended or changed; the injury to the park cannot. The lake now jams against a high terrace wall like a canal to a quay, and the way around the water is cut off. What is to become of the parks, if in the course of "improvements" designers are at liberty to take slices from their precious areas? The road is a great improvement, but it could have been made without spoiling the beauty of the park or limiting its area. There is a poor little terrace where no terrace was needed, which cuts off the view eastwards; but the men who plan such things do not consider views.

A wide walk has been cut across the Green Park, which has not been done without injuring the park, while the road up Constitution Hill hollow, dark, and fortified by hideous rails, is left in all its ugliness. The trees to form a shade avenue are already there. The grass slip against the palace garden wall is useless and should be thrown into the roadway, and the railing on the opposite side either pushed back or removed. This could have been done without limiting the area of the park, and a much better effect secured than by the bald road which now cuts the Green Park in two.

He is a courageous man who suggests the formation of a new society in the presence of the many that exist, but there might well be an association for protecting the parks, as it is clear we have not only to guard against railway and other projectors but also against the acts of those who are commissioned to make improvements in them.

London is a city of wasted opportunity for improvements. It would be easy to open up views and connect squares and parks in more airy ways, and to simplify, and at the same time dignify, many parts of the city and suburbs. The great outer parks should be connected by broad-planted roads: Hampstead Heath and Regent's Park with Victoria Park; fine squares like Lincoln's Inn Fields made accessible and brought into view from the main points near, and such precious and interesting possessions as the London docks. That dismal broad walk in the Regent's Park, with its lines of a mean kind of Elm, should be made a broad airy way with stately trees on each side. This it might be made without lessening the green area of the park, and the avenue should be continued through Park Square and the crescent; the view which would result would be worth the sacrifice of the privacy of these enclosures. The gardening of all these squares is disgraceful, and will, it is to be hoped, be some day changed. It can never be so as long as it is controlled by men who are not well-trained gardeners. Let anyone who cares about garden-design see the hideous stone walls placed lately around the islands in Victoria Park by the County Council, as well as those ugly and useless "rockeries" made of the refuse of brickyards in Dulwich Park and the Thames embankment gardens. It is a disgrace to the name of garden design, and there are many other instances of the most ignorant practice in the parks under their control.

In Lincoln's Inn Fields, one of the finest of London squares, they have lately put a ring of the common variegated Privet all round — the most stupid thing that could be done by the most ignorant of jobbing gardeners.

GORDONIA.

In this group are autumn-flowering shrubs of great beauty, yet so rare as to be almost unknown in our gardens and, in the case of *G. pubescens* apparently extinct as a wild tree, seeing that since 1790 its home in Georgia has been scoured in vain for specimens. The genus consists of ten or more species, of which two are fairly hardy and come from the Southern United States; the rest belong to the warmer parts of Asia, forming another branch of the great Tea-tribe to which Stuartia and Camellia also belong. This relationship is traceable in the tea-like fragrance which has at times caused the leaves of Gordonias to be used as a substitute for tea. Perhaps not more than four or five kinds have been in cultivation, and it is doubtful whether even these are now to be found in gardens, this being due to their short life and difficult increase. The hardier kinds, with which we are mainly concerned, will grow with some coaxing in sheltered places of the south, particularly along the coast, *Gordonia Lasianthus* having bloomed this autumn with Messrs. Gauntlett of Redruth. In Loudon's time plants were growing here and there in the Thames valley, but they are become so rare that the collections containing Gordonias could probably be counted on the fingers.

These outdoor kinds come from the Pine-barrens—a region of sand, broken by scanty peat-bogs in moist and sheltered hollows, and where these peat-layers have accumulated grow dense thickets of *Gordonia Lasianthus*, known in America as the Loblolly Bay, their myriad flowers from July to September making a display of surpassing beauty. In these wilds the Gordonia rises to a height of 70 feet or more in rich soil, with every intermediate stage of growth to that of a low shrub. The long dark roots never strike deep but run a long distance beneath the thin peaty layers, to where they can dip into the standing pools lying at the bottom of these cup-like depressions. The trees are thus not only sheltered from prevailing winds, but the ground surface is often thick with mosses which keeps the soil evenly moist and cool, and in which the falling seeds readily germinate. These Bay-swamps often cover hundreds of acres, and the tree is found throughout the marshy tracts bordering the Atlantic coast from S. Virginia to Florida, and thence in decreasing quantity along the shores of the Gulf States to the valley of the Mississippi. The second hardy kind, *G. pubescens*, was found under similar conditions on the banks of the Altamaha River by Bartram in 1770, but as has been said, no fresh find has taken place for well over a century, and the one original tree planted by the botanist at Philadelphia has recently died. All existing specimens of *Gordonia pubescens* are said to have sprung from this tree.

Gordonia Anomala.

Culture. The great bar to successful culture, even in the warmer parts of England, is the failure of the Gordonias to ripen the wood, which is mainly produced in autumn. Not only are the flowers fewer as a consequence, but the softer parts of the shoots are apt to be cut back by frost, and where this loss is repeated failure must ensue. Even in the Southern States, with an ardent sun and a fine autumn, the tips of the shoots are frequently lost in a severe winter, for they grow until the frost is upon them and the unripened parts perish as a result. There, however, it acts only as a salutary pruning and passes almost unnoticed, but in this country the loss is greater, in proportion as the growths are less ripened. With us therefore the shady places often advocated for America should be exchanged for sunny and sheltered spots, with a constantly moist soil composed of sandy peat or leaf-soil, and at the same time perfect drainage. It is not easy to find these conditions, and in this lies the difficulty found in growing the Gordonias. They seem to need the protection and the reflected warmth of a wall, and yet the dryness of such a position is against them. But admitting the difficulty, their leaves and flowers are so handsome that the trouble involved in suiting them is well repaid by the rich beauty which places these among the most charming of flowering trees. In all the introduced kinds the flowers are white or creamy-white, with a marked general resemblance, so that, while our engraving shows one of the tender species, it well suggests the peculiar charm of the Gordonias as a whole. The name Gordonia was given in honour of Alexander Gordon, a friend of the botanist by whom the group was founded. The following species have been introduced :—

G. *anomala*.—A tender evergreen shrub from Hong-Kong, where it abounds in the woods of the Happy Valley. Planted out in peat soil under glass, the shrub reaches a large size and blooms from an early stage, with pure white flowers 2 to 3 inches across coming from November. Leaf dark green and glossy, 3 to 6 inches long. Syns. *Camellia axillaris*, and *Polyspora axillaris*.

G. *grandis*.—Another tender kind requiring greenhouse treatment and handsome when well-grown. The flowers, creamy-white, of 5 large petals united at the base, unfold during spring; the leaves are thick and glossy, approaching those of the common Laurel in shape and texture. A plant of this is growing in the open air at Trewidden, Cornwall.

G. *Lasianthus*.—Loblolly Bay. A shrub rarely exceeding 10 or 12 feet in Europe but a tree of the second size in its own country, where at maturity the trunk shows a diameter of 20 inches and a height of 60 to 70 feet. It is of very erect growth, even the side branches striking upwards as a close pyramid in young trees, though with age they become more spreading. While taller and more vigorous than *pubescens* it is rather more tender, perhaps because more nearly evergreen than that kind, though apt to lose its leaves in a severe winter. It differs from it in its rather smaller and more fragrant flowers, carried on long stems, whereas in *pubescens* they are almost stemless. The handsome leaves are thick and glossy, dark-green, 4 to 6 inches long, and oval in shape, narrowing gradually to the base. Before falling they pass through phases of gold, crimson, and purple, rarely seen in evergreens, and while the effect is broken by the deep green of younger leaves, it is often sufficiently pronounced to be an added charm in winter and early spring. The flowers follow one another as a long succession from July to September, the broad-cupped petals finely contrasted with the ring of yellow stamens.

G. *pubescens*.—This shrub is very like the last in general effect, but loses its leaves in winter and is a smaller tree, rarely much above 20 feet high in its own land, and with us hardly above the size of a low dense shrub of 4 to 6 feet. It may be known from the other American Gordonia by its thinner leaves covered beneath with pale down ; the shorter stems of its more or less hairy flowers ; and the thin smooth bark of its main stems. The sweet-smelling flowers are 3 or more inches across, and in the States appear in unbroken profusion from early in August, but with us they are rarely seen much before September, and beginning late they are less abundant. The leaves turn a vivid scarlet and fall off in autumn. From the place of its discovery this kind is sometimes known as G. *Altamaha*, and was at first called Franklinia after the famous Dr. Franklin. B.

GUNNERA.

Of all plants grown in the open air in our varied climate these are the most singularly distinct. Their appearance indeed is so different from that of all ordinary vegetation that in some cases they do not seem to harmonise with it, but they have a singular attraction for many growers. There are about a dozen species, varying from gigantic herbs in which a horse and his rider might stand concealed, to tiny creeping plants which in moist places of the southern hemisphere cover the ground with a dense carpet. While most abundant in South America and New Zealand, they occur in regions as far apart as South Africa, Abyssinia, Java, Tasmania, and Hawai. Seven or eight species have been introduced, but of these some are dwarf kinds seldom seen save in collections, the Giant Rhubarbs—*G. chilensis* and *G. manicata*—being those with which gardens are adorned.

It is in the moist parts of Ireland, the south-west of England, and the Channel Islands, that these fine plants are best seen. They thrive in light rich soil, well manured and well drained, and attain their full size in places beside water where the ground is moist. They will also grow well in rich soil of a drier character, but without their waterside luxuriance. There must be shelter from rough winds, or the great leaves are spoiled before their time; good drainage is also important, for where Gunneras fail it mostly comes from the stagnation due to a cold sub-soil. Several years elapse before the plants show their character, though when the ground is dug and well manured to a depth of several feet, growth is rapid, particularly if the plant is well protected during winter by a layer of dry Beech leaves, with the cut leaves of the plants laid over all as a thatch. The covering may be removed at the end of March, but a light wrapping should still be kept at hand to guard against late frosts which cripple the plant at the outset. The first leaves are often the finest (especially if the plant is given a dressing of ammonia on starting) and their injury means a serious check to the plant. A dressing of cow-manure and frequent waterings with liquid manure wonderfully increases the size of the leaves; as much as three cart-loads of manure is sometimes given to a single large plant at one dressing. The massive flower-spikes are more curious than beautiful and many gardeners remove them as fast as they come to save the crowns from exhaustion. Increase may be by division and by seeds, which ripen freely enough in this country though the young plants grow slowly at first. It is well to have a spare plant or two coming on, for in certain soils the Gunnera exhausts itself rapidly and dies away soon after reaching maturity. This is best provided for by planting groups of three in soils of this nature, the distant effect being still that of a single crown. Seedlings of both these Giant Rhubarbs vary somewhat in character, size and shape of leaf, etc., and to this is due the two or three varieties of *G. chilensis* now found in gardens. If young plants of the two kinds were compared the choice would be for *chilensis*, which is at first neater and more interesting than *manicata* and thrives better in dry soils. But mature masses of *G. manicata* are far more imposing, and in a moist climate with a long season of growth, the ultimate comparison is all in its favour. It is also somewhat hardier, thriving as far north as Aberdeen with only slight protection. A long season is a great gain to the plants, which need time to mature their crowns before the winter begins, and as they grow best in low damp spots, this is not easy in places exposed to early and late frosts. Upon the Continent, where the winter is often too severe for them to stand in the open, they are sometimes grown in tubs and brought under glass, where they keep their leaves all winter; but with us they die away in the autumn, though the stout conical flower stems often continue far into the winter. The name Gunnera is in honour of J. E. Gunner, a Scandinavian cleric and botanist of the eighteenth century.

Gunnera arenaria.—A little plant from the sandy coasts of New Zealand, growing in low tufts of fleshy leaves about an inch long, with toothed edges. The flowers are inconspicuous and give place to little spikes of crimson berries.

G. brephogea.—A plant known only as a chance seedling, brought from Columbia on the roots of an imported Orchid. It is distinct and handsome, with broad, rough leaves upon long down-covered stems, springing from a dense crown of red scales. The stems and the unfolding leaves are at first violet, changing to reddish-brown; the leaf-surface is much veined and wrinkled, boldly lobed and irregularly toothed upon the edges, and bordered above by a narrow line of blackish-purple. For awhile in the famous collection of M. Linden at Brussels, of late the plant has not been heard of.

G. chilensis.—A plant spread over the whole of S. America, from Patagonia and Chili, where it grows in the warmer valleys and beside river-estuaries to the seashore and throughout the Andes at an increasing height until, in the Cordilleras of Columbia and Ecuador, it is found at elevations of 6,000 to 10,000 feet, forming dense undergrowth in groves of the beautiful Brazilian Wax Palm (*Ceroxylon andicola*). Though of compact habit the tufts spread upon all sides from side-shoots, and by self-sown seedlings in favourable spots. Full-sized leaves are upwards of 6 feet across, carried upon stout reddish stems of about the same length, which are very tough and full of acid juices. The tiny reddish flowers appear in a dense head or spike divided into many spikelets, and followed by orange-red fruits set thickly together. These flower-spikes are sometimes 3 to 4 feet long and as much round, while heads weighing 30 lbs. and 5 to 6 feet round have been recorded.

The plant is hardy over the greater part of Britain, if planted in free soils with a covering in winter. It is tender at Paris, but grows luxuriantly on the coasts of Brittany and Finistère, and is becoming naturalised in sheltered places. In a hard season the crowns are sometimes injured, but the plant is seldom killed outright. Masses 15 or more feet in diameter and containing scores of leaves are now not uncommon. The Chilian name is *Panke*, and the natives eat the stalks as we do Rhubarb, and use the roots for tanning leather and for the extraction of a black dye. Syns. *G. scabra*, *G. tinctoria*, and *Panke acaulis*. Two or three named forms are now grown in gardens, *major* being a good one sent out by Mr. Smith of Newry and recommended by those who have grown it, for its vigour and beauty; *longiscapa* is also of very robust growth, and carries long tapering flower-spikes unlike the usual club-shape. There are also forms distinct in leaf; one has the leaves not fully spread but more or less rigidly cupped, the veins and footstalks bright red, and the leaf-surface bronze-green; another has flat spreading leaves in which the ribs and veins are pale, and the leaf a purer green. Intermediate forms connect the two.

G. dentata.—This grows as a dense mass of creeping stems, and rounded leaves which are deeply toothed around the edges. It is found in wet boggy places of the Northern Island, New Zealand, at elevations of 1,000 to 3,000 feet.

G. *magellanica.*—A little creeping plant thriving in moist peaty soils and in shady places, and fully hardy in this country. It spreads by prostrate rhizomes which cover the ground with a carpet of rounded leaves 1½ to 2 inches across, through which the little branched flower-spikes make their way during May and June. These should be followed by red berries, but the plant seldom fruits in this country. Though similar in character it is larger than the dwarf kinds from New Zealand, and is found in slightly varying forms from Chili southwards through Patagonia and the Falkland Islands. Syn. *G. falklandica.*

Gunnera Manicata at the Water-side.

G. *manicata.*—The giant of the genus and one of the most stately of hardy plants. Where it attains its finest development, as in Ireland and the south-west of England, masses of foliage 30 to 35 feet in diameter are sometimes produced by one crown, the largest leaves being upwards of 9 feet across, and as many as seventy-eight have been counted upon a single plant. The effect of such a mass, 12 feet high when in full luxuriance, is difficult to convey in words, and though *G. manicata*—a scarce plant 20 years ago—is now fairly common, it is only under the best conditions that it attains such a size. From *G. chilensis* it differs in many ways. The leaves are larger and broader at the base, of thinner texture and a richer green, more evenly rounded and flatly spreading; the ribs and veins are light green or nearly white; and the surface smooth instead of roughly scabrous. They are not only more erect and last longer in the autumn, but the stalks of 5 to 8 feet long (according to the vigour of the plant) are spiny throughout their length and are sheathed at the base—whence the name *manicata*, "cuffed" or "sleeved." The central bud or crown, enveloped in a mass of downy pinkish scales, is often as large round as a man's body and is far less apt to split into offsets than in *chilensis*. The flower-spikes are very stout, 3 to 5 feet high, and much less dense, the tiny greenish flowers being set upon slender tapering spikelets which give the inflorescence quite a different appearance. The seeds ripen in this country but are slow to come up, germinating irregularly in the second year. The plant needs shelter and grows best in light soil, well enriched. It comes from the cold and misty mountain regions in the south of Brazil, and as discovered by Libon presented a noble appearance, with leaves 10 to 12 feet across.

G. *monoica.*—Another of the dwarf creeping kinds from New Zealand, covering moist cool ground with its rounded leaves, beneath which red and white berries lie hidden.

G. *perpensa.*—This was brought from the Cape in 1688, and has lingered in a few collections, but being tender and of little beauty has never attracted attention. The rounded leaves, like those of the Winter Heliotrope, are in tufts 18 inches high, with spikes of greenish flowers in August. B.

THE TRUMPET-LEAVED PITCHER-PLANTS (*Sarracenia*).*

THESE interesting plants belong to a small natural order of their own, divided into the three genera *Sarracenia*, *Darlingtonia*, and *Heliamphora*, their nearest allies being the Poppies and the Water-lilies. Of the Sarracenias there are six species, some of which vary considerably in size, form, and colour, some of these variations probably arising from wild hybridism. The genus was named by Tournefort in compliment to Dr Sarrazin of Quebec, who appears to have been the first to send specimens of these plants to Europe. They are all bog or marsh-plants, growing on half-buried trunks of trees or on sphagnum-moss and wet turfy soil, near water and in open places. All the Sarracenias are North American, Darlingtonia comes from California, and the rare and beautiful Heliamphora or Sun-cup from Guiana. The hardiest, oldest, and best-known of the Sarracenias is *S. purpurea*, introduced before 1640 and followed by *S. flava* in 1752, *S. rubra* in 1786, *S. variolaris* in 1803, *S. Drummondi*, in 1829, and *S. psittacina* in 1866. Popularly these are known as "Side-saddle flowers," a name at first sight a little far-fetched until the flower is closely examined, when the turned-up lobes of the broad green stigma are seen to suggest the pommel of a lady's saddle, while the riding-habit is represented by the great coloured petal that hangs down between the lobes. Other popular names for Sarracenia are Indian or Huntsmen's Cups, Trumpet-leaf, and American Pitcher-Plants.

The Sarracenias are half-hardy perennials growing from 6 to 8 inches—as in *S. purpurea* and *S. psittacina*—to 18 inches or 3 feet as in *S. flava* and the beautifully variegated *S. Drummondii*. The fully developed leaves of all are more or less trumpet-shaped, or after the manner of a coach-horn, with a lid like a penthouse arching over the mouth, though held quite stationary and never closing down over it. These lids are elegant in shape and in one kind (*S. psittacina*) quaintly hooded, while their surface is netted with highly coloured streaks and veins. All the species have various shaped leaves, some being shaped like a knife-blade, and others flanged or linear. The flowers are large and conspicuous, borne on smooth, rounded stems which may be shorter or longer than the leaves, and are naked save for three rounded bracts just below the flower. The flowers are nodding and regular, consisting of five persistent greenish sepals and five fiddle-shaped petals which are often highly coloured and soon drop or fade away. The anthers are yellow and densely clustered just below the seed-bearing capsule, while one of the most striking points about these flowers is the great size of the inverted, umbrella-shaped stigma. These hang below the nodding flowers and one of their uses would appear to be the retention of the fugacious anthers and their pollen in order to render fertilisation more certain and complete. Although the stigmas are so large (being one to two inches across) the parts to which the pollen is applied by wind or insect agency are merely points or tiny

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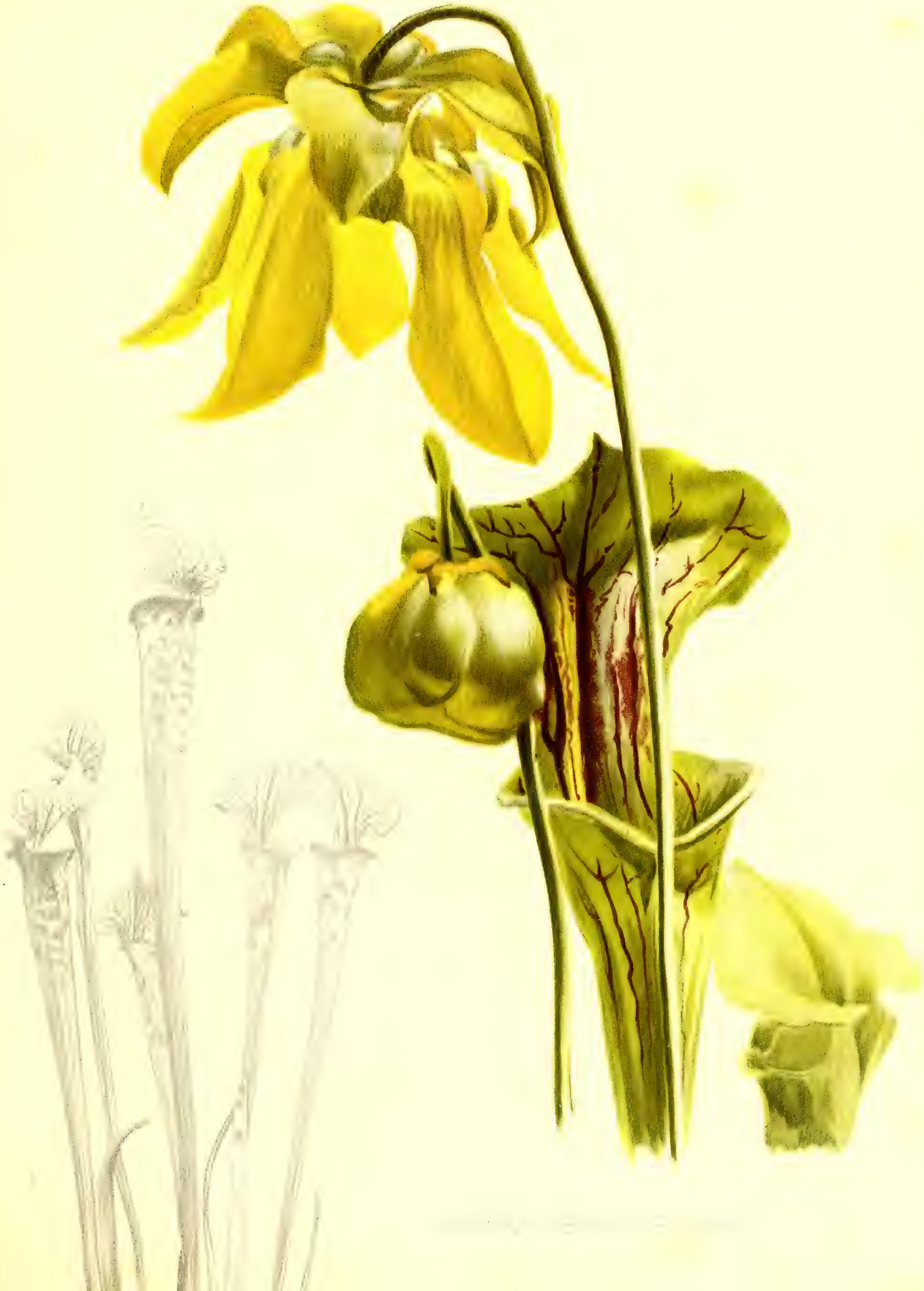
* With coloured plate from a drawing by the late H. G. Moon.



lobes jutting inwards from the emarginate lobes of the stigma itself.

The pitcher-like leaves of the Sarracenias grow in tufts or rosettes, each tube widening more or less towards its mouth. There is a green flange or leafy-wing along their under side, which probably serves as a guide for the creeping insects which frequent these plants. In structure and function the pitchers may be compared with those of the more highly developed Nepenthes, except that there is no intermediate tendril or climbing apparatus. The fixed hood or lid projects more or less over the open mouth of the pitchers and the smooth and glossy lip of the tube is folded over inwards but not in so marked a way as with Nepenthes. Just inside the pitchers there are honey-glands as an attraction to the flies, and below these a smooth and waxy slide-zone followed by a zone of depressed hairs, and at the bottom a liquid in which the captive insects are drowned and digested. There is a poison secreted by the Sarracenias similar to that of Drosera, Nepenthes, and Dionæa, and possibly this poison has some action upon the entrapped insects. The insects trapped by Sarracenias are mostly honey- and carrion-eating flies, moths, beetles, cockroaches, and ants ; very rarely wasps are found in their pitchers, but never, so far as I have seen or heard, are bees found in them. Fatal as these pitchers are to most insects there are at least two kinds that defy their snares and even rear their offspring in the deadly tubes. One of these is the Sarracenia-moth (*Xanthoptera semicrocia*), a glossy little insect provided with claw-like feet which enable it to enter or leave the pitchers at will. The other is a large flesh-eating fly (*Sarcophaga Sarraceniæ*) which lays its eggs amongst the insect refuse inside the pitchers. The newly-hatched larvæ feed on the insects entrapped by the plant, and when fully grown eat their way through the wall of the pitcher and bury in the ground, to emerge later as perfect insects. Various insect-eating birds of America also slit or tear open the pitchers and steal the insects collected within.

CULTURE.—The cultivation of these plants is easy in a greenhouse, and I have even seen a healthy collection thriving in a cold pit or under glass-lights placed on low brick walls. But to grow fine specimens, such as those formerly shown by the late Mr. Thomas Baines and others, a warm greenhouse is required. Sarracenias like their roots in water and their leaves in the sun. After the leaves reach maturity a lower temperature may be maintained, and in July or August the plants may be placed outside on a sheltered walk in the full sunshine. The late Dr. Alex. Paterson, who grew these plants well, used to make a little avenue of his specimens when the leaves were fully grown, and visitors passed along a walk bordered by Sarracenias. When so hardened off in autumn a greenhouse or frame just free from frost suffices for the winter. The plants should be repotted when growth begins in January or February into pots filled nearly half full of crocks, with the roots in a compost of peat and loam-fibre, charcoal, and clean sphagnum-moss. The plants should be firmly potted and the crowns and rhizomes raised a little above the rim. Plenty of water is required especially during active growth, but at no time should they become dry. The pots may be placed in shallow pans of water and are best arranged on a sunny shelf where they can be syringed gently three or four times each day while growing freely, in order to keep insect pests at bay. The duration of the leaves is of importance, and Macfarlane says that in the Atlantic States the foliage of *S. flava* appears in April and is mostly withered in October. The leaves of *S. rubra* endure until the end of November or even into December, while the autumn leaves of *S. Drummondii* last until February or March of the succeeding year. Those of *S. Catesbæi* remain fresh and green until a new crop has been produced at the end of April, and the leaves of *S. variolaris*, *S. psittacina*, and *S. purpurea* last still longer and in the order named. As regards flowering, *S. Catesbæi* is the earliest, flowering in February or March in its wild state. This is followed 7 to 10 days later by *S. flava*; then comes *S. variolaris*, and still later *S. psittacina* and *S. purpurea*, while *S. rubra* and *S. Drummondii* flower about a month later than *S. Catesbæi*.

Improvement among Sarracenias has been marked by successive stages. For many years we had only the wild kinds and their seedling forms, and these grown mainly as curiosities or in botanical gardens. The raising of the first garden hybrid in Ireland about 1874 gave an impetus to their cultivation which led several of the great firms to collect the best wild and cultivated forms for crossing. As a result Messrs. Veitch of Chelsea raised some new and showy kinds, as also did Mr. F. W. Moore at Glasnevin, whose first seedling was *S. Popei*. Very fine crosses between *flava* and *rubra*, *purpurea* and *rubra*, and *purpurea* and *Drummondii*, were also raised by Mr. Moore—a strain with highly-coloured pitchers and handsome wine-coloured flowers. Mr. Moore found *S. rubra* especially valuable as a pollen parent, its pollen "taking" upon nearly every flower to which it was applied, whether those of the true species or the garden hybrids of Veitch and the late Dr. Paterson. So far as I can learn the only other raiser of note was Mr. Thos. Hubberstey, gardener to O. O. Wrigley, Esq. of Bury, Lancashire, who reared *S. Wrigleyana*, *S. Swaniana*, *S. Mitchelliana*, *S. Tolliana*, and eight others sent out by Messrs. Bull of Chelsea and Messrs. B. S. Williams of Holloway from 1884 to 1891. While gardener at Quorn House near Loughborough, Mr. Cook raised at least two hybrids—*S. Cookiana*, and *S. Farnhami*—and these in turn became the parents of *S. Sanderæ* and *S. Sanderiana*. So far as can be ascertained but few hybrid Sarracenias have been raised in continental gardens. I am kindly informed by Messrs. Sander of Bruges, and M. Ed. Pynaert Van Geert of Ghent, that a list of hybrids was published in the "Semaine Horticole," 1897, p. 176.

Mr. R. I. Lynch of Cambridge writes

as follows—"Of Sarracenia hybrids I have raised three. One of them I believe has not been raised before and is a fine thing. This is *S. Drummondii* × *S. variolaris*. It is like a big *S. variolaris* with beautiful Drummondii-like markings. The next—*S. Chelsoni* × *S. illustrata*—is nothing; if not made before it is still only a further mixing up of hybrids. The third is *S. rubra* × *S. purpurea* and is simply *S. Chelsoni*. I find that Sarracenias are quite easily crossed, and the seeds are easily raised." Very few experiments seem to have been made in the rearing of the wild plants from seed, so that the possibilities in this way are practically unknown. *S. flava* is the most variable of them, but this may be owing to its having been naturally crossed with other species.

In his monograph of Sarracenia published in 1881, Dr. Masters mentions all the known species and their natural or seedling forms. He also enumerates six named hybrids and some others not then in commerce, those described being *S. Moorei*, *S. Stevensii*, *S. Williamsii*, *S. Popei*, *S. Chelsoni*, *S. melanorhoda*, and *S. formosa*. The following analytical list was published by Dr. Masters :—

Pitchers spreading horizontally or obliquely ascending.

Lid concave, hood-like	*psittacina.*
Pitcher cylindrical, straight	
Pitcher distended in the middle	*melanorhoda.*
Lid flattish, not hooded	*purpurea.*
Pitcher short and thick	
Pitcher lengthened	*Chelsoni.*

Pitcher erect, long-funnelled; wing broad.

Pitcher green	*variolaris.*
Pitcher red	*formosa.*
Wing narrow	*Drummondii.*
Lid flat or wavy	*undulata.*
Pitcher mottled above	
Pitcher not mottled	*rubra.*
Lid broad at base	
Lid acute or tail pointed	
Lid sub-orbicular	*Stevensii.*
Wing broad	
Wing narrow	*Moorei.*
Lid narrowed at base	*flava* and its forms.
Wing broad	
Wing narrow	*Popei.*

Since the publication of this table the wild plants and the earlier hybrids themselves have been again crossed and the resulting seedlings often resemble each other too closely to be defined in words although easily recognisable as distinct in growth and colour when seen under cultivation.

Best Kinds.—The following twelve kinds have been selected by myself and others as being the best and most effective for general purposes :—*S. Courtii*, *S. Drummondii alba*, *S. Farnhami*, *S. Fieldsii*, *S. flava maxima*, *S. Mitchelliana*, *S. Moorei*, *S. Patersoni*, *S. purpurea*, *S. Sanderiana*, *S. Tolliana*, and *S. Williamsii*. If six more kinds are desired the following are good :—*S. Atkinsonii*, *S. melanorhoda*, *S. Sanderæ*, *S. Swaniana*, *S. Stevensii*, and *S. Wrigleyana*. Dr. Masters points out that all the Sarracenias may be divided roughly into two groups according to the prevailing colour of their flowers.

"(*a*) Flowers red or purple, are *Drummondii*, *undulata*, *rubra*, *Sweetii*, *psittacina*, *purpurea*, and all the hybrids as far as we yet (1881) know them.

"(*b*) Flowers yellowish green or white, as in *flava* and all its forms, and *variolaris*."

Those interested in these plants will find one of the most complete collections at Kew, where they may be seen at their best while flowering in April or making their new "trumpets" in

May. At the Botanic Garden at Glasnevin, Dublin, there is also a very fine collection, with many unnamed seedling crosses raised there during the past 25 years. There are also good collections at the Botanical Gardens of Edinburgh, Glasgow, and at Cambridge, where the rare Heliamphora is well grown, and many other places. Among the many trade growers Mr. Bruce of Chorlton-cum-Hardy near Manchester generally shows them finely at the Temple Show of the Royal Horticultural Society.

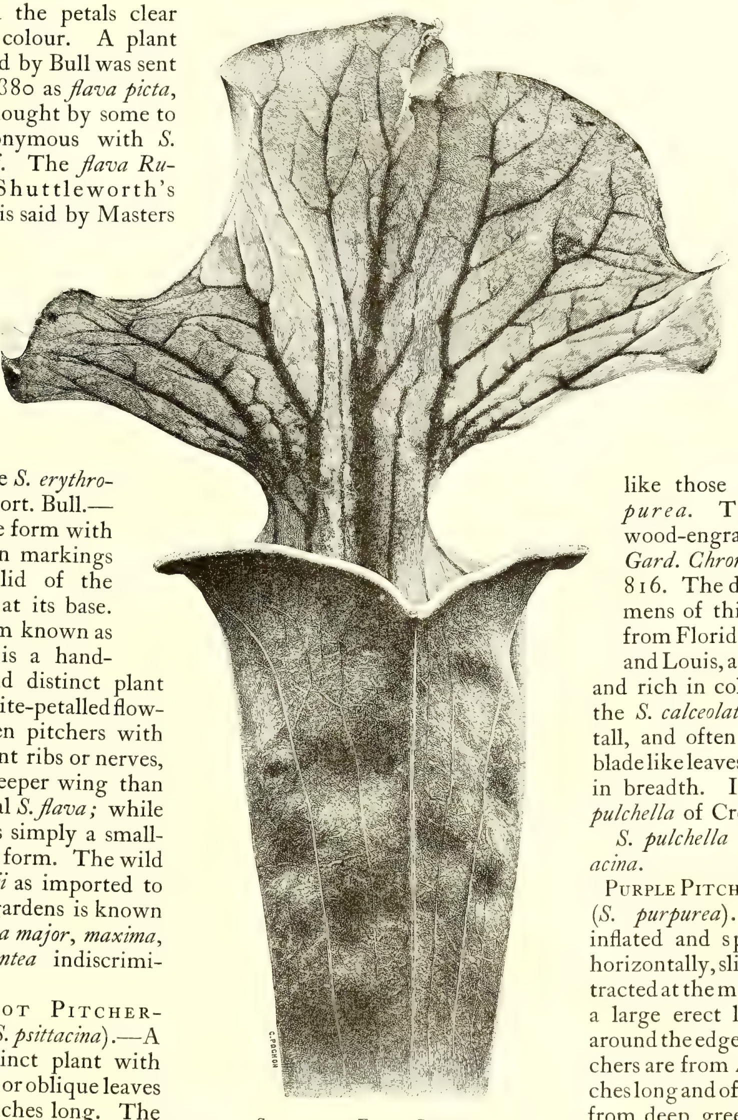
Species. *S. adunca.*—See *S. variolaris.*
S. calceolata = *S. variolaris.*

Catesby's Trumpet-Leaf (*S. Catesbæi*).—This plant may be (as Dr. Masters has suggested) the original of *S. flava* as found in books, but the *S. flava* of gardens is a different plant. Dr. Macfarlane has made a special study of *S. Catesbæi* (see references) and thinks it nearly related to *S. rubra*, although the flowers vary from yellow to straw colour. Again, natural hybrids between *S. Drummondii* and the crimson-throated *S. flava* are common in Georgia, and these appear to have been distributed to various herbaria. This species or hybrid, be it which it may, is said to be the earliest in flower in its wild haunts near Mobile, and it is also the most successful fly-catcher of the group whether wild or in the greenhouse, this being due to its rich and lasting flow of nectar. In size, colour, texture, and fragrance, the flowers differ from *S. flava*. The plant is figured in Catesby's "History of Carolina" of 1754 (Vol. II. p. 69). His notion that flies took refuge in the pitchers to escape from frogs and other enemies is curious, but quite on a par with the natural history notions of the period.

Great Trumpet-Leaf (*S. Drummondii*).—One of the most beautiful and vigorous of the wild kinds. Its erect trumpet leaves are often over 2 feet long and but slightly winged. The lid is rounded and undulate and, like the mouth of the trumpet, greenish or white, heavily netted with deep red or rose colour. This plant grows twice every year, once in the spring when it also flowers, and again in the autumn, thus remaining beautiful all the year. The flowers are 3 inches across and the petals purplish-red or crimson colour. There are two forms, one presented by the type (or *S. D. rubra* as it is sometimes called), and *S. D. alba* which is taller and the pitchers netted with green or red on a semi-transparent white ground. It is illustrated in *Flore des Serres*, t. 560 and 1071. *S. Drummondii* is sometimes known as *S. undulata* from the wavy margin of its lid. Marshes of Florida.

S. erythropus = *S. flava* var. *Rugelii.*

Yellow Trumpet-Leaf (*S. flava*).—This is the Trumpet-Leaf or Watches of the American woods and marshes. It is a plant of many forms, with leaves 2 feet high and mostly green, but varying in size at the mouth and in the colour markings. The flowers are 4 to 5 inches across and vary from creamy-white to rich yellow or golden-green. There are several named varieties, and imported plants are very varied. (*Bot. Mag.*, t. 780.) Varieties.—*Atropurpurea* is a narrow-growing form having the mouths of its pitchers and their lids suffused with dark crimson or blood-colour, with a pale halo in the centre. (Syn. *flava sanguinea.*) *Catesbæi* has large pitchers the wings of which are marked with red veins. Dr. Masters thinks it is doubtful whether this plant should not be taken as having been the original type of *flava*, as figured and named by Catesby, Elliott, and others. It is often imported with the typical *S. flava* and is sometimes grown as *S. flava picta* in gardens. *Limbata* is a large-growing form having its rounded lid bordered with dark brownish-crimson; and *maxima* a large and robust plant with very wide trumpets of a pale yellowish-green. *Gigantea*, a very fine new form which has recently gained an award of merit when shown by Mr. Bruce at the Temple Show. The pitchers are very handsome, 2½ to 3 feet high, pale green in colour and widening regularly from the base upward. The lid measures 4 to 6 inches across and is finely veined with crimson; immense flowers of deep yellow. In *ornata* the greenish pitchers are strongly netted with dark purplish-red; this variety has very large flowers fully 6 inches across, the sepals being greenish-yel-



Sarracenia Flava Gigantea.
(*Engraved for "Flora," from a plant in the Chorlton Nurseries.*)

low and the petals clear canary-colour. A plant imported by Bull was sent out in 1380 as *flava picta*, but is thought by some to be synonymous with *S. Catesbæi*. The *flava Rugelii* of Shuttleworth's MSS.—is said by Masters to be the *S. erythropus* of Hort. Bull.—is a large form with crimson markings on the lid of the pitcher, at its base. The form known as *crispata* is a handsome and distinct plant with white-petalled flowers, green pitchers with prominent ribs or nerves, and a deeper wing than in typical *S. flava*; while *minima* is simply a small-growing form. The wild *S. Rugelii* as imported to British gardens is known as *S. flava major*, *maxima*, and *gigantea* indiscriminately.

Parrot Pitcher-Plant (*S. psittacina*).—A very distinct plant with deflected or oblique leaves 3 to 6 inches long. The swollen leaves are finely veined with dark purplish-red and mottled with white near the mouth, which is nearly closed by the incurved beak-like lid of the pitcher. (*Flore des Serres*, t. 2063.) It grows and flowers less freely than other kinds; the flowers are said to be red like those of *S. purpurea*. There is a wood-engraving in the *Gard. Chron.* 1881, p. 816. The dried specimens of this at Kew, from Florida, Georgia, and Louis, are very fine and rich in colour. It is the *S. calceolata* of Nuttall, and often has knife bladelike leaves 2½ inches in breadth. It is the *S. pulchella* of Croom.

S. pulchella = *S. psittacina*.

Purple Pitcher-Plant (*S. purpurea*).—Leaves inflated and spreading horizontally, slightly contracted at the mouth, with a large erect lid, waved around the edges. The pitchers are from 4 to 12 inches long and of all shades, from deep green to dark purplish-red or crimson. Flowers 2 inches or so across on stems of 6 to 12 inches, sepals bronzed and petals red or crimson, more or less folded over the broad green stigma. This was the first known of all and is hardy in a sheltered bog-garden in a bed of sphagnum-moss. (*Bot. Mag.*, t. 849.) A very rude but characteristic woodcut, and description of *S. purpurea* or "Hollow Leaved Lavender" is given on p. 54 of John Josselyn's "New England's Rarities," a scarce little octavo, which may be seen in the Library of the Natural History (Botany) Department, at South Kensington. Its date is 1672. A very distinct and handsome variety of this plant, recently introduced by Mr. Bruce, is known as *purpurea Chorltonii.* In it the pitchers are much larger than is common, apple-green in colour netted with bright crimson veins and covered with long silky hairs.

Red-Flowered Trumpet-Leaf (*S. rubra*).—A slender plant 3 to 12 inches high, with red or crimson flowers smaller than those of *S. purpurea* and very fragrant. The leaves are green with red veins on the narrow pointed lids. It is the least ornamental of the species. (Loddige's *Bot. Cab.* 1163.) Two varieties have been described—*acuminata*, with erect red-veined leaves netted with crimson, and in which the lids are richly coloured, larger than the top of the pitcher, and remarkable for bearing two long tails; and *rubra Sweetii*, also known as the little *S. minor* of Sweet, but really a small form of this species though by some authors referred to *S. variolaris.* The fact is that there are "minor" varieties not only of both these, but of all the wild species.

S. Rugelii = *S. flava*, var.

Spotted Trumpet-Leaf (*S. variolaris*).—Leaves erect 6 to 12 inches high, trumpet-shaped, winged, and spotted with white towards the mouth and on the fuscous lid, which arches over the mouth of the tube and is hairy and netted inside with purple veins. (*Bot. Mag.*, t. 1710.) There is also a figure in Sweet's *Flower Garden* (Series II., p. 138) under the name *S. minor*, which is referred to *S. variolaris* by Nicholson but is more like a form of *S. rubra*, having red-veined tubular leaves and green sepalled, purple-red or crimson petalled flowers. The true *S. variolaris* has yellow flowers, the petals being inflected over the stigma. Syn. *S. adunca.*

Hybrids. As already indicated, wild hybrids of Sarracenia have long been known, such as those recently found by Macfarlane near Summerville S.C. between *Ss. flava* and *variolaris*, while others are common in Georgia between *Drummondii* and *flava*. The first of the many garden hybrids however was *S. Moorei* raised at Glasnevin and exhibited at the Horticultural Exhibition held at Florence in May 1874, when it received a gold medal as a special award.

S. Atkinsoniana.—A seedling from *S. flava maxima* and *S. purpurea.* It grows freely, with erect pitchers of 15 to 18 inches, green in colour with red ribs and veins. The lid is wide and heart-shaped, margined and slightly veined with reddish-purple; flowers sulphur-yellow, and fragrant. At Kew this is said to be *S. flava* × *S. rubra*, and the latter parent may account for its slender trumpets.

S. atrosanguinea.—An erect-growing and deeply-coloured form of *S. flava*, in which the lids and the upper inside surface of the pitchers is rich blood-red around a paler centre; flowers sulphur-yellow. An imported plant, it was sent out in 1879 and received a certificate from the R.H.S.

S. Chelsoni.—A cross raised by Messrs. Veitch in 1879, its parents being *S. purpurea* and *S. rubra.* Its pitchers are erect, a foot or more high, and of rich claret-purple colour; deep crimson flowers 3 to 4 inches across. One of the best in its free growth and fine colour.

S. Courtii.—Named after the late Mr. Court, who raised it for Messrs. Veitch as a cross between *Ss. purpurea* and *psittacina.* Pitchers swollen, half-decumbent, and of a rich deep crimson; flowers red. 1885.

S. Claytoni.—A distinct plant with erect, highly-coloured pitchers, vinous-purple shading to crimson.

S. crispata.—Also known as *S. flava crispata* and possibly a natural cross between *S. flava* and *S. rubra*, having come from America as a wild plant about 1879. The erect pitchers are green, with an open network of red veins.

S. Crispiana.—A new hybrid raised by Mr. Bruce of Chorlton-cum-Hardy and staged at the recent Temple Show of the R.H.S. It is a handsome plant coming from *Courtii* crossed with *Sanderiana*, and shows a blending of the two in its curved pitchers of about 18 inches high, slender at the base and widening to the mouth which is closely overhung by a lid 2 inches across. The colour is light crimson with white markings, and the flowers are crimson.

S. Cookiana.—Raised by Mr. Cook while gardener at Quorn House near Loughborough, and one of the parents of Sander's hybrids.

S. decora.—Probably from *S. psittacina* and *S. variolaris*; sent out in 1890.

S. Dormeri.—This is a natural hybrid between *S. flava* and *S. purpurea*, collected in America and sent by Mr. Dormer to Messrs. R. Veitch & Son of Exeter. It has received an award of merit from the Royal Horticultural Society.

S. excellens.—A neat-growing cross between *Ss. variolaris* and *Drummondii alba.* The pitchers are green, spotted with white above, and closely netted with reddish-purple veins. 1884.

S. exculta.—An erect-growing hybrid between *S. flava atropurpurea* and *S. Drummondii.* The pitchers are green below, with the upper part and the lid greenish-white profusely netted with crimson veins. 1884.

S. exoniensis.—A natural hybrid, collected by Mr. Dormer in America, and, like *S. Dormeri*, a natural cross between *S. flava* and *S. purpurea*; pitchers 12 to 15 inches high, red with a green wing, and veined with crimson-purple. Sent out by Messrs. R. Veitch of Exeter.

S. exornata.—Habit and leafage of *S. purpurea* but more erect, dark green, with netting and suffusion of dark reddish-purple in bold and effective contrast. Said to come from *Ss. purpurea* and *crispata.* 1884.

S. Farnhami.—A handsome kind, its large open trumpets showing tesselated markings and finely ornamented margins; flowers red. This hybrid and *S. Cookiana* were raised at Quorn House near Loughborough, the residence of Mr. Farnham, a lover of these plants.

S. Fildesii.—A dwarf, wide-mouthed form of *S. flava* of uncertain origin. Nicholson says probably synonymous with *flava Catesbæi*, but my plant (obtained from Mr. Bruce the specialist of Chorlton) is quite distinct, and is more like Rugel's form of the typical *S. flava.* It grows 9 to 24 inches high, widening rapidly to a spreading trumpet-like mouth; pitchers self-green in colour, and fine deep yellow flowers. One of the largest and best kinds.

S. Flambeau.—A cross between *S. purpurea* and an unknown kind, with crimson-red pitchers and cherry-red flowers. 1886.

S. flava × *Chelsoni.* — This has greenish pitchers suffused with crimson, 12 to 16 inches high. Tubes and lids bright red with darker veins. It is elegant and free-growing, as seen at Kew.

S. flava × *purpurea.*—Trumpets green 15 to 18 inches high, with broad lids and a few dark red veins. Free-grower, as seen at Kew.

S. formosa of Veitch.—An improved form of *S. psittacina* raised for Messrs. Veitch by crossing with *S. variolaris*, but near *psittacina* in its decumbent pitchers about 8 inches long and the nearly closed lid. The pitchers are beautifully netted with crimson veins.

S. formosa of Bull.—A cross between *Ss. purpurea* and *variolaris*, said to be one of the Wrigley seedlings. 1884.

S. heterophylla.—A variety (or species) treated by American authors ("Eaton's Man." Ed. VI. 1833) as intermediate between *Ss. flava* and *purpurea*, but we have never seen the plant. It is described as having distended pitchers, the whole plant slender and of a pale yellow colour.

S. hybrida.—Trumpets 18 inches to 2 feet high, red or bronzy and somewhat *S. Drummondii*-like in form, as grown at Kew.

S. illustrata.—From *S. Stevensii* (itself a hybrid) crossed with *S. flava picta.* Its long funnel-shaped pitchers are yellowish-green, strongly marked with longitudinal crimson ribs and cross veins, extending to the lid and throat.

S. Maddisoniana.—A seedling from *S. variolaris* crossed with *S. psittacina.* Of dwarf growth, with erect, incurving and broad pitchers, greenish with dull red veins. Lid large, curving over the mouth of the tube, and strongly ribbed with red veins and intricate marginal netting. The mouth of the pitcher shows the pale translucent spots common to both parents. 1884.

S. Mandaiana.—A scarce wild cross between *S. flava* and *S. Drummondii*, intermediate in character, and found growing with them. The pitchers are about 2 feet high and light green in colour, with faint white markings. Mouth broad with a lid proportionately large, waved around the edges and slightly incurved, darker green than the tube, shaded red and blotched with white. Sent out by Messrs. Pitcher and Manda in 1893.

S. melanorhoda.—Another Chelsea seedling, from *S. purpurea* crossed with the hybrid *S. Stevensii.* It comes near *purpurea* in habit and may be regarded as an improved form of it, with blood-red pitchers about 8 inches long and deep red flowers. 1883.

S. Mitchelliana.—A fine dark variety raised by crossing *S. Drummondii rubra* and *S. purpurea* and nearer the last-named in growth though quite distinct in its more erect and graceful habit. Pitchers 9 to 12 inches long and rich green finely veined with crimson, which suffuses the entire surface as the pitchers mature and extends to the undulated lid as a deep crimson netting. Named after a well-known orchid grower. Flowers deep reddish-crimson. 1884.

S. Moorei.—The first garden hybrid, raised at Glasnevin by the late Dr. David Moore about 30 years ago. Its erect pitchers resemble those of *Drummondii rubra* but are finer in colour, the lid being suffused with rich crimson or claret-red. The flowers are large and handsome, with petals of bright red, buff, or leather-colour. The parents were *S. flava* crossed with *S. Drummondii.*

S. Patersoni.—Commemorates the late Dr. Alexander Paterson of the Bridge of Allan, who raised it by crossing *Ss. purpurea* and *flava.* It resembles *S. Chelsoni*, but its pitchers are a brighter crimson with white markings or mosaic; flowers blood-red or crimson.

S. Popei.—A very beautiful kind raised at Glasnevin by crossing *Ss. flava* and *rubra.* The pitcher is erect and narrow, green, veined with red after the manner of *S. rubra;* flowers large, of a glowing red colour.

S. porphyroneura.—Erect pitchers of pale green, more or less heavily netted with dark purple veins about the upper part of the tube and on the large rounded lid. Introduced about 1882.

S. Sanderæ.—A charming plant raised at St. Albans by crossing *S. Drummondii alba* with *S. Cookiana.* The pitchers are graceful in form and clear in colour, with the broad margin of the lid finely frilled and veined; flowers crimson. It received a certificate from the R.H.S. in 1896.

S. Sanderiana.—One of the best hybrids, derived from *S. Drummondii rubra* and *S. Farnhami.* The pitchers are a rich crimson netted with darker veins, and of fine form; flowers bright rose-colour. It received a certificate from the R.H.S. in 1896.

S. Stevensii.—Raised at Trentham 25 years ago from *Ss. purpurea* and *flava*, and named after Mr. Stevens the gardener there. It has green pitchers netted near the broad mouth and upon the rounded lid with reddish-brown veins. The flowers are enormous, being 6 inches across, sepals green with brown edges, petals crimson and creamy yellow inside, and the bright green stigmas 3 inches across. This plant makes fine specimens, with pitchers lasting a long time in perfection, and with sweetly scented flowers. 1880.

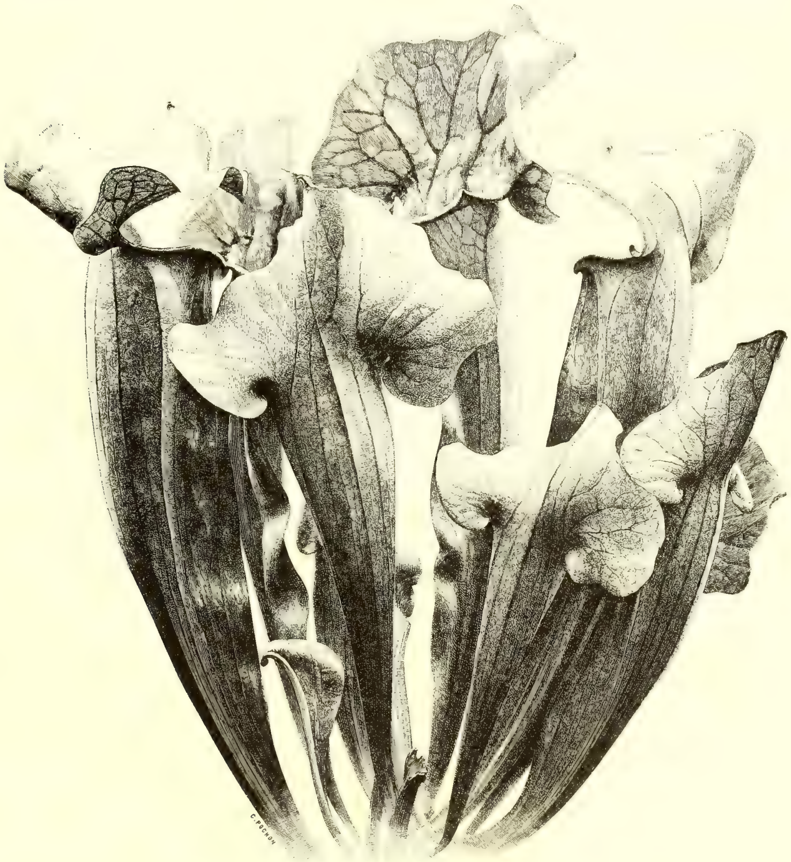
S. Swaniana.—A cross between *Ss. purpurea* and *variolaris.* The broad rounded lid and the inside of the mouth is richly netted with crimson veins on a white ground. The pitchers are mostly green with crimson netting, and the flowers a soft brick-red. The erect pitchers are 6 to 9 inches high and the white-mottled lid is suggestive of *S. variolaris.* 1884.

S. Tolliana.—A seedling from *S. Drummondii alba* crossed with *S. flava.* Leaves long, rather slender and funnel-shaped, with a straight-cut mouth of purple-red colour, or greenish with purple ribs and veins. The lid is broadly kidney-shaped and pale-green, netted with dark purple-red; flowers deep red. 1884.

S. vittata-maculata.—A cross between *Ss. purpurea* and *Chelsoni*, sent out in 1891.

S. Wilksiana.—Another of Mr. Bruce's new hybrids exhibited at the recent Temple Show. It is a cross between *purpurea* and *melanorhoda*, with green pitchers (18 inches high) heavily streaked with vivid crimson.

S. Williamsii.—Probably a wild hybrid between *S. purpurea* and *S. flava.* The plant resembles *flava* in habit and was imported with it, but it has much shorter green pitcher, ribbed with reddish-purple, lined with crimson, and with a broad, widely-gaping mouth. The side lobes of the lid are incurved as in *S. purpurea.* The flowers approach those of *purpurea* in form and colour. Among hybrids it comes near *S. Stevensii* but is of dwarfer habit and bears red flowers. Named after the late



SARRACENIA WILLIAMSII.

Mr. B. S. Williams of Hollaway. Our life-sized wood-engraving of this plant is from a photograph taken during the past summer, in the collection of Mr Bruce, of Chorlton-cum-Hardy.

S. Willisi.—A dwarf and very distinct kind, coming nearest to *Swaniana*, with wide-mouthed pitcher and a large lid with crimson markings. Raised at Chelsea between *Ss. Courtii* and *melanorhoda*, some ten years since.

S. Wilsoniana.—This comes from *Ss. purpurea* and *flava*, and has erect leaves traversed with dark crimson ribs and cross veins. The wing and the lid are netted with deep purplish-crimson. It is a handsome plant and received a certificate from the Royal Horticultural Society. 1884.

S. Wrigleyana.—A plant raised about 1888 between *Ss. psittacina* and *Drummondii alba*, and considered one of the best of the Lancashire hybrids. Its pitchers are 12 to 15 inches high, slightly curved, dilated in the centre, and veined with red which contrasts finely with the white mottling on the swollen part of the pitcher; flowers bright red. This charming plant commemorates Mr. Wrigley of Bridge Hall, Bury, Lancs, whose gardener Mr. Hubberstey reared a fine series of hybrid Sarracenias.

Those interested in the literature and history of Sarracenias, and who wish for still further information, may find it in the botanical libraries at the Natural History Museum, Cromwell Road, South Kensington; or in the library in the Herbarium at Kew.

References.—For the species and literature see Sereno Watson's Index to North American Botany, 1878, p. 39; Master's Monograph of Sarracenias in Gard. Chron., 1881, June 25, p. 817; July 2, p. 11; and July 9, p. 40; Nicholson's Dictionary of Gardening, vol. 3, p. 1887, and supplementary volume; Garden, vols. 1, pp. 59, 201, and 420; 4, p. 207; 5, p. 399; 8, p. 500; 11, p. 470; 17, p. 302; 20, p. 595, and other notes; Boulger, Gard. Chron., 1881, p. 627; De Candolle, Prodromus, vol. 17, p. 4, etc.; in Oliver's edition of Kerner's Nat. Hist. of Plants, vol. 1, p. 125, are interesting physiological details; see also Messrs. Veitch and Son's Catalogues, 1878 to 1905; Messrs. Bull's Lists of New and Rare Plants, 1880 and 1884; Sander's New Plants, 1897, for description and figures of some of the best hybrids; for Macfarlane's study of S. Catesbæi see Contributions from the Bot. Dept. of the Universities of Pennsylvania, 1904, vol. 2, p. 426; Bailey's Encyclopædia of American Horticulture, article Sarracenia.

F. W. BURBIDGE.

Trinity College Botanical Gardens,
Dublin.

THE TWINING FERNS (*Lygodium*).

Of rare beauty of form, these delicate trailing ferns are little seen in gardens, though charming for pillars and leafy screens in the stove and greenhouse, and no trailers are more effective for decoration. Not difficult to cultivate either, for in a climate so little suited to Ferns as the French Riviera, they will thrive with the least care, while under glass in our country, few tender Ferns are more easily managed. They have well defined times of growth—when they can hardly have too much water—followed by a rest, while the stems harden. When fully matured, the fronds last for years and differ from those of all other Ferns in their power of lengthening indefinitely, climbing over all that comes in their way, and weaving thick green curtains. In the forests of the tropics they are found covering acre after acre of bush with their fragile garlands, even draping tall trees to a height of nearly 100 feet, and floating again earthwards in graceful festoons. Their great vigour fits them for winter-gardens and to cover pillars, arches, walls, or rafters, where they will stand more light than most Ferns, and increase in beauty from year to year.

In parts of southern India *L. scandens* grows in profusion around the moist rice-fields and on the hills up to a height of 3,500 feet where during the wet season (lasting from June to September), there are 130 inches of rain, and during this time the plants grow at a surprising rate. Save for scanty showers the rest of the year is dry, with much variation in temperature, and this cool, dry season toughens the fronds and allows a time of rest. In the south of France a treatment which included abundance of water from the end of May to September, followed by months of cooler weather and lessened watering, gave complete success. In British gardens conditions like these are often best met with in a vinery, where back walls might be given up to these climbing Ferns, trained upon strings into a screen of vivid green, and the cut "trails" are very useful for the dining-table. The times of rest, free growth, and ripening, are the same for Vines and Ferns; the trails of 10 to 20 feet formed in one season, are ample for most purposes; and the plants are more satisfactory when cut down year by year than when allowed to run to greater lengths. Though they can be grown in pots, they are best planted out in narrow borders of light loam and peat or leaf-mould, made porous with sand and chopped sphagnum, and with plenty of drainage. In the fernery they may be used to cover walls and rafters, and even trained under the glass to give shade when the aspect is not in full sunlight; they are also specially good for covering the stems of tall Tree-ferns or Palms in a pretty way. The plants must be well watered at the root when in active growth, and syringed freely on warm days, except *polystachyum* and *venustum*, two hairy kinds which are injured by overhead watering. They may also be prettily used in large hanging baskets, the stronger trails trained upwards along the chains, and the shorter left to droop freely around the sides. When neglected in pots, they are subject to scale and thrip, from which it is impossible to free the delicate fronds; and the best thing to do is to cut down and start afresh. Drought also causes shrivelling, from which the plants only recover by being cut down and started again.

Most kinds bear seed freely and the fertile fronds with their handsome spore-masses are very beautiful, but only the cooler kinds—*japonicum* and *palmatum*—are ever raised from seed to any extent, the usual way of increase being division of the tough black roots in early summer. These two kinds, and *articulatum* from New Zealand, grow well in a cool greenhouse; others such as *pinnatifidum*, *scandens*, and its form *microphyllum* need very little warmth, but the others require stove heat. The best known and most useful kind is *L. japonicum* (often miscalled *scandens*) which is much grown for its cheerful green trails, less lasting than the "Smilax" (*Myrsiphyllum*) but of beautiful effect and the plant may be grown in a fern-case. *L. articulatum* is a more vigorous kind also well suited to a cool house, and *palmatum*, with short stems of 2 to 4 feet, is more truly a creeper than a climber, and is seen at its best on rocks in a cool fernery. In chosen nooks of our warmer gardens these kinds are hardy enough to grow in the open air; the experiment has been tried with success in the United States, even in seasons of severe frost. For pillars in a warm house *L. dichotomum* is a good kind of rapid growth, with elegant and massive foliage lasting a long while in perfect condition. Comprising less than thirty kinds, the Lygodiums are found in all the warmer parts of the globe, though no species is common to both the old and new worlds. Abundant in the eastern tropics, they extend east to Japan, south to Australia, and thence through the islands of the Pacific to New Zealand. Westward, they occur in Madagascar and parts of tropical Africa, reappear in Brazil and in Mexico, extending northward in one kind (*palmatum*) through the United States, as far as Massachusetts. At one time this kind was in such demand for decoration that its dried fronds became the object of an important industry, and the plant was in such danger of extinction that its destruction is now forbidden under heavy penalties. The following kinds have been described, and most of them are to be found in Fern collections.

Lygodium articulatum.—A strong grower from New Zealand and Norfolk Island, where it forms matted screens of foliage in the forests, hanging fold upon fold to a height of 60 feet or more. In this country it grows well in a greenhouse or cool fernery, with rich green leaflets which differ widely according as they are barren or seed-bearing. The barren fronds are leathery in texture, twice forked in segments of 1 to 3 inches long, ½ inch broad, rounded at the tips, and with often a grey under-surface. The fertile fronds are many times forked and roughly fan-shaped, the segments contracted into short spikes of spore-masses.

L. Boivini.—A distinct kind with barren leaflets of crisp parchment texture, smooth on both sides, about 6 inches long and an inch wide, cut into 3 or 4 blunt segments on winged stalks. The fertile ones are shorter, narrower, and closely lobed. Madagascar.

L. dichotomum.—A plant of beautiful effect, with very long shoots rising from a thick crown, and set with finely cut leaflets arranged in pairs and rather far apart. The barren fronds are 10 to 12 inches long, leathery in texture and a lovely bright green paler beneath. They often last in good condition for several years. The fertile segments are much reduced, with the seed-masses arranged as erect spikelets round the edges. The plant is well suited for large hothouses, growing freely and conspicuous, though so finely cut. In health the growth is so rapid as to make it the stoutest of all, but if neglected it seldom recovers. It has often to be grown from five to seven years before it becomes fertile. A form of this, known as *dichotomum polydactylon* has fronds in varying shades of green, yet more finely cut, and crested. Eastern tropical Asia. Syns. *L. circinatum*, *flexuosum*, or *pedatum*.

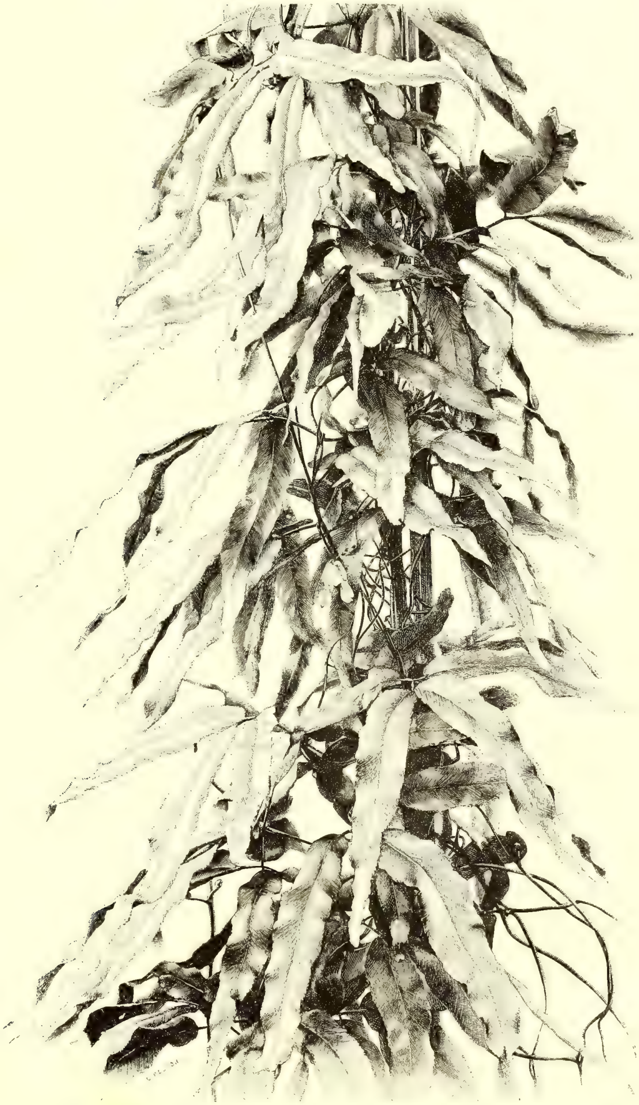
L. digitatum.—A stout grower with very long shoots and hand-shaped fronds, which are finely toothed when barren, and edged with spore-masses upon both surfaces when fertile. New Granada and Central America.

L. heterodoxum.—A plant of the West Indies, Mexico, and Guatemala, with leaflets of 4 to 6 inches, very thin in texture, with seed masses in rows upon the margin in all the fertile fronds. Syns. *L. Lindeni*, and *L. spectabilis*.

L. japonicum.—The commonest kind, easily grown in a vinery or cool house, yielding an abundance of slender garlands of 10 to 15 feet from strong stools which increase in force from year to year. Cut down each spring, these form one of the most useful forms of foliage for shower-bouquets and decoration, keeping fresh far into the winter. The leaflets are closely set, 4 to 8 inches long, and roughly triangular. The barren ones are slightly notched on the margin; the fertile segments, while of similar outline, are much contracted and studded with erect masses of seed at the tips of every lobe, which scatter and spring up in all directions when ripe, making this the easiest kind of all to propagate. The value of its wiry stems for all kinds of decoration has caused it to be widely grown in gardens, but mostly under the name of *L. scandens* which rightly belongs to quite another plant. The wild plant covers a vast area from the Himalayas to Japan, the East Indies, and Australia.

L. lanceolatum.—A strong-growing climber from Madagascar, with long and very broad leaflets which are tilted upwards and divided into 3 or 4 pairs of equal segments set on a zigzag-midrib, glossy green in colour, and of stout texture. When fertile, the segments bear close rows of scaly spikes around the margins upon both sides. Their number decreases as the plant ascends, the topmost fronds often consisting of 2, or only 1 pinnule, deeply lobed. Syn. *L. madagascariensis*.

L. palmatum.—Also known as the Hartford Fern of the United States, and the hardiest and most graceful plant of the group; found in moist woods from Massachusetts to Florida, growing in light soil and partial shade. Its finest "trails" are only 3 to 4 feet long, and creep rather than climb among the low brushwood of the river valleys, the pale green stems arising at short intervals from a dark, creeping, hairy tipped rootstock. The tendency of these roots to advance in a straight line unfits them for pots, and the best way of growing the Fern is to plant it out upon rocks in a cool fernery, where it forms one of the most beautiful of draperies. Though slender, the stems are strong and tough, but often only 2 feet long under cultivation. As in other kinds the pinnæ are of two sorts, the fertile ones palm-shaped and bright green, 1½ to 2 inches broad, cut into several rounded lobes which differ in number (from 3 to 7), in size, and in shape. The upper part of the "trails" are crowded by the seed-bearing fronds, composed of finger-



A Fine Twining Fern (Hygodium).

(*Engraved for "Flora," from a plant in the Fern Nurseries, Sale.*)

like spores resembling little catkins, and made up of tiny pockets each with its rich brown seeds. These brown fringes are the prettiest part of the plant, and appear from the end of August throughout the autumn. Whether dried or used fresh, these fruited trails are in great demand for decoration, so that at one time the plant was in danger of extermination from the continual loss of its seed. To save it from this fate the government of the United States imposed penalties ranging from a £20 fine to a year's imprisonment, for its unlawful destruction. A mixture of equal parts of leaf-mould and sphagnum suits this dainty little plant, with abundance of water at the root from March to September.

L. pinnatifidum.—A beautiful plant of free growth in stove heat, but scarce in gardens. Its leaflets are soft and thin in texture and very bright green, set thickly in pairs upon the main stem, and almost without stalk. They are 8 to 12 inches long and nearly as broad, cut into 3 or 4 pairs of rounded or heart-shaped segments with an odd one at the tip, and these often again more or less divided, and sparingly covered with down. The little spike-like spores form a pretty margin to the fertile leaflets. Tropical Asia, Australia, and Africa.

L. polystachyum.—A very distinct stove kind, differing from all its fellows in its red coloured stems, its crowded leaflets finely and regularly cut, and its own method of fruiting. The leaflets are of 8 to 12 inches long and about half as wide, borne upon very short stalks, and beautifully waved. They are cut into many segments set upon short stalks in 9 to 12 pairs along the midrib, and these are again cut into blunt lobes of leathery texture, much contracted towards the tip. In this kind the difference between the barren and fertile fronds is but slight. The stems, of a rich claret red, are covered with short white down, seen also more sparingly upon both sides of the pinnæ. Like other hairy Ferns, this kind dislikes sprinkling. Malay States.

L. reticulatum.—A fine bold kind from the Southern Seas, of free growth, its tough wiry stems crowded with massive foliage of the finest effect upon pillars, or trained to a light trellis in the stove. The fronds are a rich glossy green, and come best in a shadier place and planted in more substantial soil than is needed by others of the group. They are very fine in texture, varied as to length and shape, according to age and the vigour of the plant. They are twice cut to the centre and divided into many exact pairs of leaflets with an odd one at the tip ; these are lance-shaped, with a square or heart-shaped base, beautifully waved, and finely toothed at the edges. The seeding segments are broader and shorter edged, with tiny fruit-masses like rows of blunted teeth : a rare kind of difficult increase. Syns. *L. Forsteri* or *L. Schkuhri.*

L. scandens.—A Fern quite apart from *L. japonicum*, which mostly bears its name. It is of very slender growth, bushy, and unlike any other kind in the freedom with which it bears fresh young shoots all along the old stems; in this way it weaves dense thickets of verdure in India, tropical China, and the East Indies. The fronds are short and closely set upon wiry stems of 20 feet or more, variable in size and shape, and a pale grey-green colour. The segments are also most variable, set alternately in 4 or 5 pairs upon each side of the central stalk, with an odd one at the top, and are mostly undivided, with a rounded or heart-shaped base. They are set rather far apart and at right angles to the central stalk ; at times however they are again cut to the centre, with increased effect. The seed spores are found in close rows upon the edges of the fertile fronds, appearing in their early stages like tiny strings of green beads. This kind thrives in a greenhouse, and is found in several distinct forms:—*microphyllum* being a common variety with short, broad segments ; and *Fulcheri*, a handsome Australian form, with long fronds and short segments, beautifully fringed when fertile.

L. semihastatum.—A little known kind from the Mariana Islands, with one-forked short-stemmed leaflets cut into long undivided segments of leathery texture, set (when fertile) with showy spore-masses upon the edges.

L. subulatum.—A very distinct kind from the islands of the Indian Ocean, its long trails furnished with roughly triangular leaflets, twice cut to the centre into close-set, overlapping segments, 6 pairs and an odd one in each leaf.

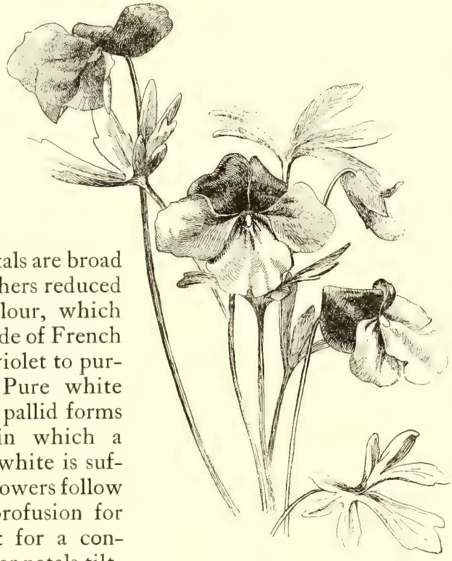
L. venustum.—A plant of strong and rapid growth, needing much space to develop. The trails rise to a great height from creeping rootstocks, with leaflets held upon stalks so short as to appear stemless. They are 6 to 12 inches long and 4 to 6 inches wide, cut into many undivided segments of about 3 inches, varying in number from 4 to 12 pairs, set rather loosely along either side of a zig-zagged midrib, which is terminated by an odd segment larger than the rest. They are deeply lobed and of a pretty pale green, soft to the touch, spreading at the base, and deeply serrated round the edges. The spore-masses appear as closely set rows of long brown spikelets, but these fertile fronds are scarce. The stems are rather brittle and densely covered with short grey hairs, which also cover both sides of the leaflets giving a distinct appearance, but on this account the plant should never be wetted overhead. Of more difficult culture than others of the group, this kind has become rare in gardens, though beautiful when well grown. West Indies and tropical South America, to Peru. Syn. *L. polymorphum.*

L. volubile.—A close-growing Fern from Cuba and tropical South America, bearing stemless leaflets nearly as broad as long, and composed of an uncut terminal segment of 3 to 6 inches, and several pairs of wedge-shaped side segments, of firm texture and bright green colour. The fertile growths bear long spikes of seed-spores along their edges. A beautiful plant in a warm greenhouse, very pretty for pillars in its dense growth. Syn. *L. hastatum.*

THE BIRD'S-FOOT VIOLET

(*Viola pedata*).

THIS dainty little hardy flower is unhappily difficult to grow, and has remained uncommon spite of many importations from North America. Among the thirty odd kinds found in that land of Violets, this is the most beautiful, with its leaves cut into narrow segments resembling the spreading claws of a bird, and its mauve or pale violet flowers, in shape between a Violet and a small Pansy. The plant is widely distributed but is often local, covering it may be hundreds of acres with a dense carpet of flowers, and then disappearing from a large tract of country. Its season of beauty is May and June, later than in our British violets, while it often blooms again in early autumn, and flowers of the same patch may vary in size, shape, and colour. In some the petals are broad and rounded, and in others reduced to a mere strip of colour, which may vary from a soft shade of French grey through tones of violet to purple and deep blue. Pure white flowers are scarce, but pallid forms are not uncommon in which a groundwork of bluish-white is suffused with pink. The flowers follow one another in rich profusion for several weeks and last for a considerable time, the upper petals tilted back with a peculiar effect which has been happily expressed by one writer as that of a shy animal with its ears set back. Its capricious nature is seen in the fact that even within a short walk of its native haunts, and in spots to all appearance equally favourable, it is often found impossible to establish it with success, so that its failure in some of our gardens is not surprising. It grows best in light sandy or gritty soils and in dry places, is found more rarely upon limestone, and it avoids wet and shady spots. Partial shade does not seem to hurt it, provided the soil be dry, as on roadside banks and in the clearings of sunny woodlands, but it is quite as frequently found in the open upon sunny hillsides, and always thickly massed in such spots.



VIOLA PEDATA BICOLOR.

(*Engraved for "Flora," from a black-and-white drawing by the late H. G. Moon.*)

Even where fairly established in a garden it needs care in winter and disappears if left to itself. This comes from its dying away in winter to a short rootstock from which the true roots, which are fine and thread-like, proceed. This rootstock varies little in length from year to year, for what it gains at one end it loses at the other, with a tendency to lift itself out of the ground which is mostly seen in marsh and woodland plants — a provision of nature to keep pace with deposits of falling leaves and wash-down soil, which are a part of such conditions. Like other cultivated plants of this nature it is always better for an annual top-dressing, and unless this is given to *Viola pedata* its little trunk-like stems finish by so growing out of the ground as to perish during frost. To maintain it in health a dressing of leaf-soil and sand should keep pace with its growth, and in this way new roots are coaxed from the upper part of the stem as those on the lower part perish. The plant grows only in sandy or gritty soils and in open places, with a cool root-run, which is best secured in rock-gardens by such a top-dressing. Heavy soils should be lightened by the addition of leaf-mould and sand, and one of the best protections from the loosening power of frost is a surfacing of old cocoa-nut fibre. The plant often succeeds better in pots than in the open air, not so much from any tenderness as from the greater care given to pot-plants in the way of soil and top-dressing.

It is well flowered in pans in the Alpine House at Kew, with twenty to thirty flowers on one tuft; and it has also flowered well in the rock-garden there. Though most of our plants are imported, it is easy to raise seedlings, some of which may even flower in their first season, though more usually in the second and third years. Seed is not freely produced however, many of the flowers being sterile. Cuttings of the side-shoots which sometimes break from the main stem, will also root in sandy soil under glass. Coarse-growing spurious forms of *Viola pedata* are often met with, and the weedy *Viola pinnata* of Canadian woods also does duty for it upon occasion.

Varieties. The best of these is *bicolor*—shown in our engraving. It is a floral gem rare in its wild state, and even more difficult to grow than the common form. It is found sparingly in the eastern States and more frequently further west, particularly in Colorado. It is somewhat tender with us, the damp of our winters being against it, so that even in the south it needs the shelter of a tilted pane of glass, and is best in a cool frame, flowering some weeks earlier than *pedata* itself. The flowers which are very beautiful, measure an inch or more across, the two upper petals being a rich velvet-purple and the lower parts a soft blue or mauve. The blending of these colours is exceedingly effective. There is a scarce white variety, *alba*, and many unnamed shades of colour, as well as a pretty fragrant form of the common kind which is not often seen in this country. B.

FRITILLARIA DISCOLOR.*

First shown before the Royal Horticultural Society nearly 20 years ago under the name *Korolkowia discolor*, this plant was again exhibited by Miss Willmott in March last as a Fritillaria. It is indeed a distinct wild form of *F. Sewerzowi*, the plant found by Gen. Korolkow in the mountains of Turkestan more than 40 years ago, its name being afterwards changed by Regel to that in honour of its finder; but while this plant and its varieties differ widely from most of the Fritillaries, they are so closely allied to them that few present-day botanists maintain the distinction. Unlike almost anything else, the strange blend of colours in the flowers and the strongly glaucous leaves combine to make it a striking if not a beautiful plant, with stout leafy stems of 12 to 15 inches, and somewhat suggestive of a small Crown Imperial (*F. imperialis*). The flowers appear in early spring and are at their best in the plant figured, dingy variations being not uncommon. *F. Sewerzowi*, of which this is the best form, is very variable in colour, the dull yellow-green flowers of some varieties being hardly distinguishable from the leaves, whereas in others bronze, purple, and dull yellow tints occur. In the form *discolor* dark brownish-purple blotches—just seen on the inside of one of the upper flowers—are a marked feature; also the more intense grey-green of the foliage.

The plants shown by Miss Willmott were in pots, and this is the best way of growing them, for (though from an elevation of several thousand feet in a cold region) they are not hardy in this country, failing in heavy soils where the tubers often rot during winter, and the stems apt to be cut by frost just when coming into bloom. Under glass, whether in a greenhouse or a cold frame, they are safe, and bloom from the middle of March. In wet soils the tubers are best lifted and stored after flowering.

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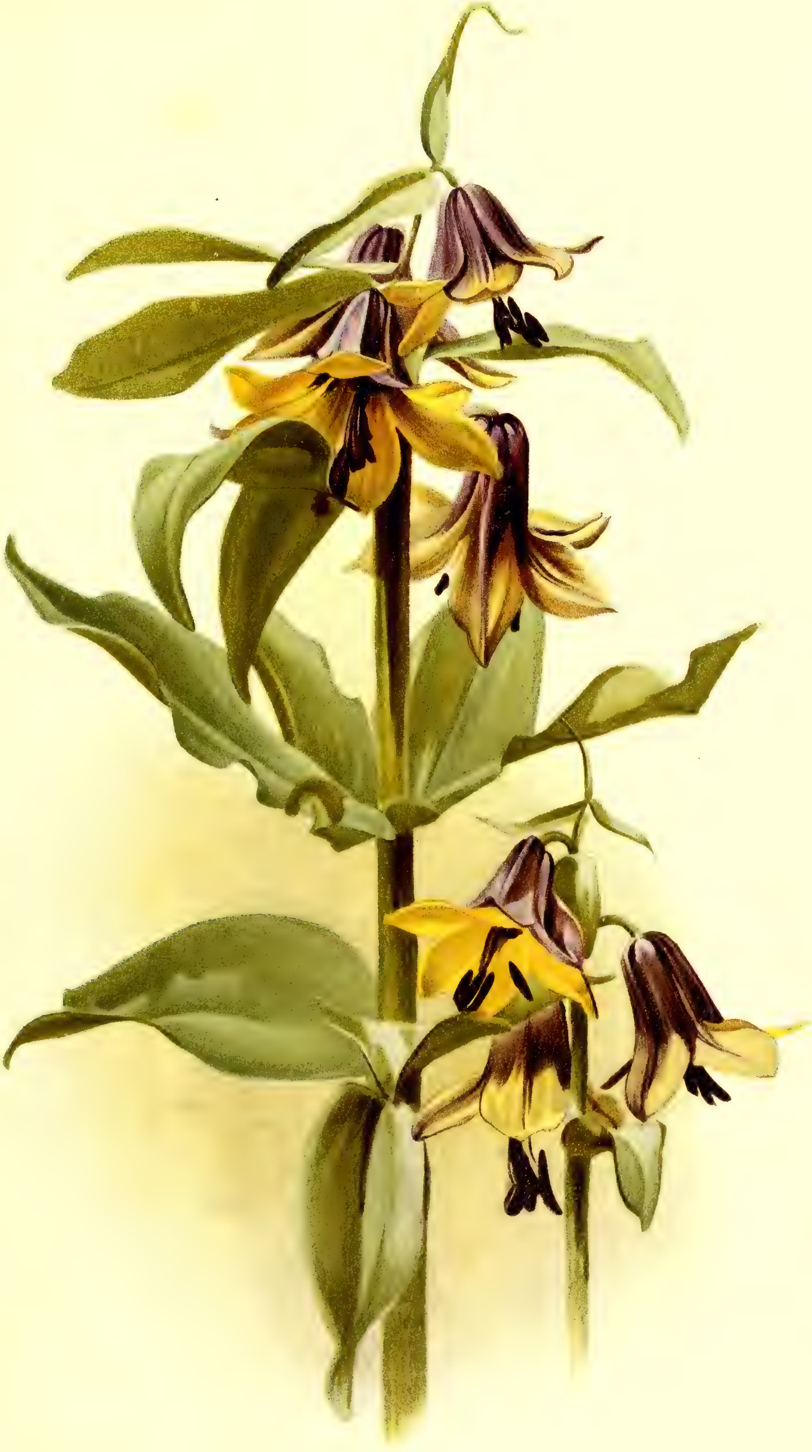
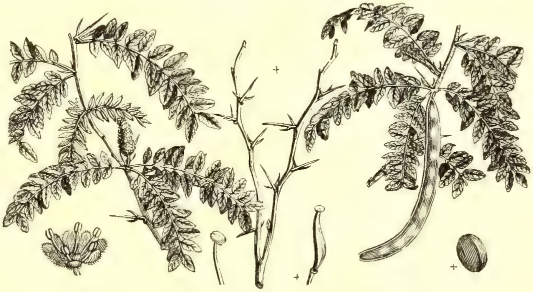
* With coloured plate from a drawing by the late H. G. Moon.



FRITILLARIA DISCOLOR

GYMNOCLADUS CANADENSIS—THE AMERICAN COFFEE-TREE.

Among the scarcer hardy trees of North America few are more remarkable than the Kentucky Coffee-Tree, *Gymnocladus canadensis.* Though many good examples are to be seen here and there in our parks and river-valleys, it has remained a rare tree spite of its perfect hardiness and beauty of foliage. Its peculiar appearance during winter has sometimes been urged against it by planters, the head showing but a few stout branches held stiffly erect, devoid of spray, and without any apparent buds. This strangely dead look has given rise to the Canadian name of Stump Tree, but though hardy in that country and even named in its honour, it is a scarce tree so far north and is indeed nowhere common, growing only here and there in sheltered river-valleys and always in the richest soil, along with the Hickory, the Black Walnut, the Red Elm, and the Tulip Tree. Though seemingly so lifeless throughout the winter, with late spring the tree bursts into almost tropical luxuriance. The bluish-green leaves are divided into many leaflets and unfold to a length of 3 feet and more upon young trees and 2 feet wide at the base, though as the trees grow old the leaves diminish to about half this size. This crown of foliage hangs in a rounded mass and would seem almost too heavy save for the graceful effect of the individual leaves.


Gymnocladus—Flower and Fruiting Spray.

The tree flowers less frequently with us than upon the continent, and often not until mature or becoming old, especially in the case of male trees. For the sexes are apart in the Gymnocladus, and though the flowers are not very different in appearance, the fertile trees are often earlier in beginning to bloom. The flowers are graceful when present in quantity but are not showy, coming as loose spike-like heads of greyish-white, at the same time as the leaves. The tree hardly ever fruits with us though it ripens seed in France and other parts of Europe where the summers are longer and drier, and the appearance of the female tree, thickly laden with its broad curved pods of reddish-brown and 5 to 8 inches long, is very striking. Until that stage is reached one would hardly associate the tree with the Bean-tribe, and indeed it belongs to the tender section of the family along with Cæsalpinia, Bauhinia, and other tropical trees. These flat pods contain a sweetish pulp and 6 or 7 large bean-like seeds of a grey-colour, which are very hard and were formerly roasted and ground into powder by the early settlers for the making of a drink—whence the American name of Coffee-Tree. This use has long ceased, but the pods are sometimes eaten fresh, or preserved in sugar like the Tamarind.

While hardy quite into the north of Britain and not very particular as to soil, it is only seen at its best in the deep rich soils of our warmer bottom-lands, and when so placed is of far more rapid growth than upon meagre or cold soils. Where its roots can go deep it stands drought well, but is not easy to move except while young, the roots being few, thick, and striking straight down in the same peculiar way in which the few stout branches stand bolt upright. Young trees are easily raised from imported seed, or from root-cuttings which sometimes grow away at a great pace, reaching 3 to 4 feet in a year, and sometimes sulk and will hardly move at all. This same sulking is often seen with carefully moved trees, so young ones should always be chosen as being more likely to get over this trouble. Once fairly started the tree grows very regularly, and fast in view of its short season, for the great leaves are the last of any to appear in spring, and fall with those of the Horse Chestnut in the autumn. The whole tree is characteristic, with a head narrow and pyramidal, though appearing more rounded in summer from the ample leaves, while the stem and branches are covered with dark-grey bark so rough and deeply fissured, and with so many projecting fragments, that it may be known even at a distance by this alone. The wood is very tough and compact, lasting well in contact with the soil, and though cross-grained, difficult to season, and hard to work, of some value for building, and in cabinet-making for its fine rosy colour and high polish. An added merit is that the wood matures so fast that there is very little waste even in small trunks, the sapwood being reduced to a few thin layers. Mature trees reach a height of 60 to 80 feet with a trunk several feet in diameter, and though so little planted of late years as to be unknown in many nurseries, there are fine trees in the country which have reached these dimensions. A tree so different from any other, so hardy, and so easily grown, deserves a place wherever suitable conditions can be found.

GYMNOCLADUS CHINENSIS.

One of the most interesting results of our fuller knowledge of the Chinese flora has been the finding of trees and plants belonging to genera until lately thought to be peculiar to North America. This Chinese Gymnocladus is one of these. It was first brought to Europe from Shanghai and was somehow supposed to be common there, whereas it is now doubtful whether it exists there at all. Its actual distribution is similar to that of the Chinese Tulip-tree, extending from Kiukiang in the province of Kiangsi to Mount Omi in Western Szechuan, but unlike the Tulip-tree it is confined to the Yangtsze Valley, never ascending to elevations above 3,000 feet.

The Chinese tree averages 20 to 40 feet in height, is very handsome, and in general appearance similar to the American tree. It differs in having leaflets only half the size, obtuse and emarginate, instead of acuminate. The flowers are violet instead of greenish and the seed-pods are only half the length, very much thickened, and but slightly compressed laterally, with a short point at the apex. These pods are horny and the inner layers become soapy if steeped in water. From this property it derives its Chinese name of "Ju tsao chio"—The Good Soap Tree—and the pods are used so generally for washing as to be on sale in the shops throughout the Yangtsze Valley. For cleansing their hair and for washing delicate fabrics, the people consider them superior to European soaps. The fruits of four other trees, *Gleditschia sinensis*, *Gleditschia Delavayi*, *Pancovia Delavayi*, and *Sapindus Mukorossi*, are also used in this way by the Chinese, but these are all considered inferior to the Gymnocladus. The seeds are very hard and black, about the size of a small marble, and average 2 to 4 in each pod; they are used for making rosaries, and, when split in halves, for making thread smooth and glossy. As far as my observation goes this tree is nowhere common, though frequently cultivated on account of the value of its pods.

E. H. WILSON.

THE HEAVENLY BAMBOO
(*Nandina domestica*).

So valued is this little evergreen in Japan that there is hardly a garden without its clump of "Nandin," and in many parts of China (now supposed to be its true home) its beauty is quite as much esteemed, as is shown by its name of "Heavenly Bamboo" among the common people. And certainly at its best the Nandina is full of charm, with its leaves cut into almost fern-like segments and showing fine variety of colour, with its graceful tufted growth and spikes of white flowers, and the clusters of rose-red fruits too rarely seen in this country. For many years kept almost entirely in our greenhouses it has of late been used more freely in the garden, and in the open soils of the south and south-west has proved hardy save in severe winters, when the upper shoots are sometimes injured. The doubt as to hardiness has certainly hindered its wider use, and its precise degree of resistance is best

FRUITING SPRAY OF NANDINA.

shown by the fact that in China, when fully ripened, it withstands 15 to 20 degrees of frost; in one of the nurseries near Paris a quantity of plants have long stood in the open unprotected, fruiting freely during recent winters; and, even in Switzerland, it has proved perfectly hardy when well protected by snow. In our own country it grows fairly well in the milder parts of Scotland, but there and elsewhere if exposed to cold, or brusque changes of temperature, it is apt to cast its leaves in winter instead of remaining evergreen, and this prevents its ever becoming the thing of beauty that it is in more favoured places. The fact that it is mostly treated as a shade-loving plant not only increases the risk from cold but prevents the fruit setting, whereas if planted in a sheltered but fairly open spot, screened during summer from hot sun at midday but otherwise freely exposed, the plant would gain in beauty and in vigour.

The best indication of treatment for Nandina is the reminder that it is nearly related to the Barberries and needs similar care to the fine-leaved shrubs of that family. Like them of somewhat slow growth, it must be planted where its shoots will not be cut back by cold and where, when once established, it can remain, for though one of the easiest of shrubs to transplant, it is when the older stems rise from a thicket of young shoots that the Nandina is most beautiful, and this occurs only in strong and well-established plants. When the stems become naked below much of this charm is lost, until, by generous treatment and cutting back, new growths can be forced from the roots, whence they break freely when the plant is in robust health. The finest specimens in Europe are probably to be seen at Pau, where special attention has been given to the Nandina and conditions seem to suit it as in few other spots. Graceful stems of 8 to 10 feet are there not uncommon, densely clothed with foliage which changes from a soft red when first expanding to lively green with finally a bluish tinge in the mature leaf, while after the first touch of frost in autumn they pass again from bronze to purple and from purple to crimson.

When these changes are watched in a large group of plants, with all the variety of individual form and varying stages of colour, the beautiful effect is not soon to be forgotten. And when to these rich autumn tints is added the heavy crimson clusters of pea-like berries shining like wax, which remain untouched by birds and hang from November to March, the Nandina may be well classed as one of the finest of evergreen shrubs. In Japan these clusters are much used for house decoration, and for want of Holly the British residents in the far East turn to them for Christmas decorations. Unfortunately with us, though the small creamy-white flowers are common enough, the fruits are rarely seen and are pale red in colour.

The Nandina may be increased from seeds sown in bottom heat during spring, their germination being slow and irregular, and the plants requiring to be wintered under glass for the first few years. Cuttings of the partly ripened shoots taken in August and September, will also root in sandy soil under a handlight or in a cool greenhouse, if given time. The best effect is gained by planting a group in light soil, which if poor, should be enriched by digging in peat, leaf-mould, and rotten manure. In ground so prepared the growth will be vigorous and the leaves ample and of rich colour, even though exposed to sunlight, which is necessary to well-ripened wood but has a bad effect upon starved plants. In dry seasons copious watering is necessary, a cool moist soil being essential to full luxuriance. In the colder parts of the country north of the Thames valley, the Nandina may be tried upon walls with protection in winter or grown in pots for the greenhouse, but under these conditions its native charm is so lost that no one familiar with the plant at its best would consider such trouble repaid.

Seedlings vary in character and two distinct forms are grown in gardens—*purpurea*, in which the leaves are of a permanent purplish-crimson colour ; and *gigantea*, a form of free growth in which the foliage is more ample and abundant. This variety exists in the rich collection formed by the late Major Gaisford at Offington Park. B.

ENGLISH NAMES FOR TREES.

Perhaps the greatest treasure-house for the tree-lover ever likely to be opened to us, is in the forest wealth of North America. When we think of the beauty of our own woodlands and the few trees that go to make it, one may well be astonished at the richness of North America in trees when, in the list which we are about to give, it is stated that there are nearly five hundred kinds of hardy trees. Even a tenth of that number, well chosen, should be a splendid addition to the woodlands of Britain and Western Europe. If they came from tropical or sub-tropical climates they would be of much less value to us, however remarkable, but these come from climates often colder than our own.

One thing that hinders our use and knowledge of these trees in a plain planter's way, is the Latin nomenclature. The first step to making use of such treasures would be to find some recognised name by which they could be known and asked for, and we are glad to say that this most welcome step has been taken by the American Division of Forestry at Washington, by the publication of a list of the accepted names of all the trees of the country—not an easy task, because many of them grow in a great range of territory and people give them different names in each district, so that the aim of the compilers has been to take what was on the whole the most widely accepted name.

" While most of our forest trees are named both by botanists and laymen, a great number of entirely different kinds, or species, have received the same name, and also the same species has received a great number of names by which it is called in different parts of its range of occurrence. This confusion of names has led not only to many annoying inconveniences and misunderstandings, but often to fatal mistakes, as when a nurseryman sends an entirely different kind of tree from that intended by the customer."

It is just the same or worse in our own case. Planters have not necessarily much to do with botanical nomenclature and they may not know the perplexities to which it gives rise. Take for example the Western Hemlock, of which the name has been changed every few years ; in a recent manual of forestry published in the United States the old names are not given, an omission which leads to dreadful confusion among those who have only the books of the past, published in England, France, and Germany. This march of science is inevitable no doubt, but whatever the reason or non-reason of it, we have to face the facts and we think the greatest good is to have an English name, which does not necessarily prevent the use of a Latin name in its due place. Also we ought to respect our English names, many of which are older than some of the so-called scientific ones invented by naturalists in modern days. We strongly advise that the English names be adopted both by nurserymen in their catalogues and by planters on their labels, giving the Latin name where need be.

The list is published in bulletin No. 17 of the " Division of Forestry " ; it is the work of George B. Sudworth, dendrologist of the Division, and is issued from the Government Printing Office at Washington. We omit all but the essential names, which we have arranged in alphabetical order for convenience of reference. A certain number of kinds from the warmer States and unsuited to our climate are omitted, and in two instances we have ventured to change the names adopted by the American compiler. This is in respect of the two species of Catalpa, rendered Catalpa and Hardy Catalpa : *Catalpa* is strictly not English at all, and we prefer the names adopted in the Kew list and by Mr. Sargent in his Manual—Indian Bean and Western Catalpa.

Abies amabilis, Amabilis Fir.
,, *arizonica*, Arizona Cork Fir.
,, *balsamea*, Balsam Fir.
,, *concolor*, White Fir.
,, *Fraseri*, Fraser Fir.
,, *grandis*, Lowland Fir.
,, *lasiocarpa*, Alpine Fir.
,, *magnifica*, Red Fir.
,, *nobilis*, Noble Fir.
,, *shastensis*, Shasta Fir.
,, *venusta*, Bristle-cone Fir.
Acacia Farnesiana, Huisache.
,, *Greggii*, Devil's Claw.
,, *Wrightii*, Texas Catsclaw.
Acer circinatum, Vine Maple.
,, *glabrum*, Dwarf Maple.
,, *macrophyllum*, Oregon Maple.
,, *Negundo*, Box-elder.
,, *Negundo californicum*, California Box-elder.
,, *pennsylvanicum*, Striped Maple.
,, *rubrum*, Red Maple.
,, *rubrum Drummondii*, Drummond's Maple.
,, *saccharum*, Sugar Maple.
,, *saccharinum* (Syn. *dasycarpum*), Silver Maple.
,, *spicatum*, Mountain Maple.
Æsculus californica, California Buckeye.
,, *glabra*, Ohio Buckeye.
,, *octandra* (Syn. *Æ. flava*), Yellow Buckeye.
,, *octandra hybrida*, Purple Buckeye.
Ailanthus glandulosa, Ailanthus.
Alnus acuminata, Lanceleaf Alder.
,, *maritima*, Seaside Alder.
,, *oregona*, Red Alder.
,, *rhombifolia*, White Alder.
,, *tenuifolia*, Paperleaf Alder.
Amelanchier alnifolia, Western Serviceberry.
,, *canadensis*, Serviceberry.
,, *canadensis obovalis*, Long-leaf Service Tree.
Amyris maritima (*A. sylvatica*), Torchwood.
Anamomis dichotoma (Syn. *Eugenia dichotoma*), Naked Stopper.
Andromeda ferruginea, Andromeda.
Anona glabra, Pond Apple.
Aralia spinosa, Angelica-tree.
Arbutus arizonica, Arizona Madrona.
,, *Menziesii*, Madrona.
,, *xalapensis*, Mexican Madrona.
Asimina triloba, Papaw.
Avicennia nitida, Blackwood.
Betula lenta, Sweet Birch.
,, *lutea*, Yellow Birch.
,, *nigra*, River Birch.
,, *occidentalis*, Western Birch.
,, *papyrifera*, Paper Birch.
,, *populifolia*, White Birch.
Broussonetia papyrifera, Paper Mulberry.
Bumelia angustifolia, Saffron Plum.
,, *lanuginosa*, Shittimwood.
,, *lycioides*, Buckthorn Bumelia.
,, *tenax*, Tough Bumelia.
Bursera simaruba, Gumbo Limbo.
Canella winterana, Cinnamon-bark.
Canotia holacantha, Canotia.
Carpinus caroliniana, Blue Beech.
Castanea dentata, Chestnut.
,, *pumila*, Chinquapin.
Castanopsis chrysophylla, Goldenleaf Chinquapin.
Catalpa catalpa (Syn. *C. bignonioides*), Indian Bean.
,, *speciosa*, Western Catalpa.
Ceanothus arboreus, Tree Myrtle.
,, *thyrsiflorus*, Blue Myrtle.
Celtis mississippiensis, Sugarberry.
,, *occidentalis*, Hackberry.
,, *occidentalis reticulata*, Palo Blanco.
Cercidium floridum, Greenbark Acacia.
,, *torreyanum*, Palo Verde.
Cercis canadensis, Redbud.
,, *canadensis pubescens*, Downy Redbud.
,, *reniformis*, Texas Redbud.
Cercocarpus ledifolius, Mountain Mahogany.
,, *parvifolius*, Valley Mahogany.
Chamæcyparis Lawsoniana, Port Orford Cedar.
,, *nootkatensis*, Yellow Cedar.
,, *thyoides* (*C. sphæroidea*), White Cedar.
Chilopsis linearis, Desert Willow.
Chionanthus virginica, Fringe-tree.
Chrysobalanus icaco, Cocoa Plum.
Chrysophyllum monapyrenum, Satinleaf.
Chytraculia chytraculia, Stopper.
Citharexylum villosum, Fiddlewood.
Cladrastis lutea (Syn. *C. tinctoria*), Yellow-wood.
Cliftonia monophylla (Syn. *C. ligustrina*), Titi.
Coccolobis laurifolia, Pigeon Plum.
,, *uvifera*, Sea Grape.
Colubrina reclinata, Naked-wood.
Condalia obovata, Bluewood.
Conocarpus erecta, Florida Buttonwood.
Cordia Boissieri, Anacahuita.
,, *sebestena*, Geigertree.
Cornus alternifolia, Blue Dogwood.
,, *florida*, Flowering Dogwood.
,, *Nuttallii*, Pacific Dogwood.
Cotinus cotinoides (Syn. *Rhus cotinoides*), American Smoke-tree.
Cratægus æstivalis, Summer Haw.
,, *apiifolia*, Parsley Haw.
,, *brachyacantha*, Hog Haw.
,, *coccinea*, Scarlet Haw.
,, *cordata*, Washington Haw.
,, *crus-galli*, Cockspur Thorn.
,, *Douglasii*, Black Haw.
,, *elliptica*, Downy Yellow Haw.
Cratægus flava, Yellow Haw.
,, *macracantha*, Longspine Haw.
,, *mollis*, Downy Haw.
,, *punctata*, Dotted Haw.
,, *saligna*, Willow Haw.
,, *tomentosa*, Pear Haw.
,, *uniflora* (Syn. *C. parviflora*), Small-leaf Haw.
,, *viridis*, Green Haw.
Crescentia ovata (*C. cucurbitina*), Black Calabash.
Cupressus arizonica, Arizona Cypress.
,, *goveniana*, Gowen Cypress.
,, *Macnabiana*, Macnab Cypress.
,, *macrocarpa*, Monterey Cypress.
Cyrilla racemiflora, Ironwood.
Dalea spinosa, Indigo Thorn.
Diospyros texana, Mexican Persimmon.
,, *virginiana*, Persimmon.
Dipholis salicifolia, Bustic.
Drypetes keyensis, Guiana Plum.
,, *lateriflora* (Syn. *D. crocea*), Florida Plum.
Ehretia elliptica, Anaqua.
Eugenia buxifolia, Gurgeon Stopper.
,, *Garberi*, Garber Stopper.
,, *monticola*, White Stopper.
,, *procera*, Red Stopper.
Euonymus atropurpureus, Waahoo.
Exostema caribæum, Princewood.
Exothea paniculata (Syn. *Hypelate*), Inkwood.
Fagus atropunicea (Syn. *F. ferruginea*), American Beech.
Ficus aurea, Golden Fig.
,, *populnea*, Poplar-leaf Fig.
Fraxinus americana, White Ash.
,, *anomala*, Dwarf Ash.
,, *Berlandieriana*, Berlandier Ash.
,, *caroliniana* (Syn. *F. platycarpa*), Water Ash.
,, *cuspidata*, Fringe Ash.
,, *Greggii*, Gregg Ash.
,, *lanceolata* (Syn. *F. viridis*), Green Ash.
,, *nigra* (*F. sambucifolia*), Black Ash.
,, *oregona*, Oregon Ash.
,, *pennsylvanica*, Red Ash.
,, *profunda*, Pumpkin Ash.
,, *quadrangulata*, Blue Ash.
,, *texensis*, Texas Ash.
,, *velutina*, Leather-leaf Ash.
Fremontdendron californicum (Syn. *Fremontia*), Fremontia.
Gleditchia aquatica (Syn. *G. monosperma*), Water Locust.
,, *triacanthos*, Honey Locust.
,, *triacanthos lævis*, Thornless Honey Locust.
Gordonia altamaha (*G. pubescens*), Franklinia.
,, *lasianthus*, Loblolly Bay.
Guajacum sanctum, Lignum-vitæ.
Guettarda elliptica, Guettarda.
Gyminda grisebachii, Gyminda.

Gymnanthes lucida (Syn. *Sebastiana*), Crabwood.
Gymnocladus dioicus (Syn. *G. canadensis*), Coffee Tree.
Hamamelis virginiana, Witch Hazel.
Helietta parvifolia, Baretta.
Heteromeles arbutifolia, Christmasberry.
Hicoria (Syn. *Carya pecan*), Pecan (Hickory).
„ *alba*, Mocker Nut (Hickory).
„ *aquatica*, Water Hickory.
„ *glabra*, Pignut Hickory.
„ *laciniosa*, Shell-bark Hickory.
„ *minima*, Bitternut Hickory.
„ *myristicæformis*, Nutmeg Hickory.
„ *odorata*, Small Pignut Hickory.
„ *ovata*, Shagbark Hickory.
„ *villosa*, Pale-leaf Hickory.
Hippomane mancinella, Manchineel.
Hypelate trifoliata, White Ironwood.
Icacorea paniculata (*Ardisia Pickeringia*), Marlberry.
Ichthyomethia piscipula, Jamaica Dogwood,
Ilex cassine (*Ilex dahoon*), Dahoon Holly.
„ *decidua*, Deciduous Holly.
„ *monticola*, Mountain Holly.
„ *opaca*, American Holly.
„ *vomitoria*, Yaupon Holly.
Jaquinia armillaris, Joewood.
Juglans californica, California Walnut.
„ *cinerea*, Butternut.
„ *nigra*, Black Walnut.
„ *rupestris*, Mexican Walnut.
Juniperus barbadensis, Southern Red Juniper.
„ *californica*, California Juniper.
„ *communis*, Dwarf Juniper.
„ *flaccida*, Drooping Juniper.
„ *monosperma*, One-seed Juniper.
„ *occidentalis*, Western Juniper.
„ *pachyphlœa*, Alligator Juniper.
„ *sabinoides*, Mountain Juniper.
„ *scopulorum*, Rocky Mountain Juniper.
„ *utahensis*, Utah Juniper.
„ *virginiana*, Red Juniper.
Kalmia latifolia, Mountain Laurel.
Kœberlinia spinosa, Kœberlinia.
Laguncularia racemosa, White Buttonwood.
Larix laricina (*L. americana*), Tamarack.
„ *Lyallii*, Alpine Larch.
„ *occidentalis*, Western Larch.
Leitneria floridana, Corkwood.
Leucæna glauca, Leucæna.
„ *pulverulenta*, Chalky Leucæna.
Libocedrus decurrens, Incense Cedar.
Liquidambar styraciflua, (Red or) Sweet Gum.
Liriodendron tulipifera, Tulip tree.
Lyonothamnus floribundus, Santa Cruz Ironwood.
Lysiloma latisiliqua, Wild Tamarind.
Magnolia acuminata, Cucumber Tree.
„ *acuminata cordata*, Yellow Cucumber.
„ *Fraseri*, Fraser's Umbrella Tree.
„ *glauca*, Sweet Magnolia.
„ *grandiflora*, Evergreen Magnolia.
„ *macrophylla*, Largeleaf Umbrella Tree.
„ *tripetala*, Umbrella Tree.
Melia azedarach, China Tree.
Mimusops Sieberi, Wild Sapodilla.
Mohrodendron carolinum (Syn. *Halesia tetraptera*) Silverbell Tree.
„ *dipterum* (Syn. *H. diptera*), Snowdrop-tree.
Morus celtidifolia, Mexican Mulberry.
„ *rubra*, Red Mulberry.
Myrica californica, California Wax-Myrtle.
„ *cerifera*, Wax-Myrtle.
„ *inodora*, Odourless Myrtle.
Nyssa aquatica (*N. uniflora*), Cotton Gum.
„ *sylvatica* (*N. multiflora*), Black Gum.
Ocotea Catesbyana (Syn. *Nectandra*), Lancewood.
Olneya tesota, Sonora Ironwood.
Osmanthus americanus, Devilwood.
Ostrya Knowltoni, Knowlton Hornbeam.
„ *virginiana*, Hornbeam.
Oxydendrum arboreum, Sourwood.
Parkinsonia aculeata, Horse-bean.
„ *microphylla*, Small-leaf Horse-bean.
Paulownia tomentosa, Paulownia.
Persea borbonia (Syn. *P. carolinensis*), Red Bay.
„ *pubescens*, Swamp Bay.
Picea Breweriana, Weeping Spruce.
„ *canadensis* (Syn. *P. alba*), White Spruce.
„ *Engelmanni*, Engelmann Spruce.
„ *Mariana* (Syn. *P. nigra*), Black Spruce.
„ *Parryana* (*P. pungens*), Blue Spruce.
„ *rubens* (*P. rubra*), Red Spruce.
„ *sitchensis*, Sitka Spruce.
Pinckneya pubens, Fevertree.
Pinus albicaulis, White-bark Pine.
„ *aristata*, Bristle-cone Pine.
„ *arizonica*, Arizona Pine.
„ *attenuata*, Knobcone Pine.
„ *Balfouriana*, Foxtail Pine.
„ *cembrioides*, Mexican Pinon.
„ *chihuahuana*, Chihuahua Pine.
Pinus clausa, Sand Pine.
„ *contorta*, Shore Pine.
„ *Coulteri*, Coulter Pine.
„ *divaricata*, Jack Pine.
„ *echinata*, Shortleaf Pine.
„ *edulis*, Pinon.
„ *flexilis*, Limber Pine.
„ *glabra*, Spruce Pine.
„ *heterophylla*, Cuban Pine.
„ *Jeffreyi*, Jeffrey Pine.
„ *Lambertiana*, Sugar Pine.
„ *mayriana*, Arizona long-leaf Pine.
„ *monophylla*, Single-leaf Pinon.
„ *monticola*, Silver Pine.
„ *muricata*, California Swamp Pine.
„ *Murrayana*, Lodgepole Pine.
„ *palustris*, Longleaf Pine.
„ *ponderosa*, Bull Pine.
„ *ponderosa scopulorum*, Rock Pine.
„ *pungens*, Table-mountain Pine.
„ *quadrifolia*, Parry Pinon.
„ *radiata* (Syn. *P. insignis*), Monterey Pine.
„ *resinosa*, Red Pine.
„ *rigida*, Pitch Pine.
„ *sabiniana*, Gray Pine.
„ *serotina*, Pond Pine.
„ *strobiformis*, Mexican White Pine.
„ *strobus*, White Pine.
„ *tæda*, Loblolly Pine.
„ *Torreyana*, Torrey Pine.
„ *virginiana* (Syn. *P. inops*), Scrub Pine.
Pisonia obtusata, Blolly.
Planera aquatica, Planer Tree.
Platanus occidentalis, American Sycamore.
„ *racemosa*, California Sycamore.
„ *Wrightii*, Arizona Sycamore.
Populus acuminata, Lanceleaf Cottonwood.
„ *angustifolia*, Narrowleaf Cottonwood.
„ *balsamifera*, Balm of Gilead.
„ *deltoides* (Syn. *P. monilifera*), (Common) Cottonwood.
„ *Fremontii*, Fremont Cottonwood.
„ *grandidentata*, Large-tooth Aspen.
„ *heterophylia*, Swamp Cottonwood.
„ *tremuloides*, Aspen.
„ *trichocarpa*, Black Cottonwood.
Prosopis juliflora, Mesquite.
„ *odorata*, Screwbean.
Prunus allegheniensis, Allegheny Sloe.
„ *americana*, Wild Plum.
„ *angustifolia*, Chickasaw Plum.
„ *avium*, Sweet Cherry.
„ *caroliniana*, Laurel Cherry.

Prunus cerasus, Sour Cherry.
,, *demissa*, Western Choke Cherry.
,, *emarginata*, Bitter Cherry.
,, *hortulana*, Garden Wild Plum.
,, *ilicifolia*, Holly-leaf Cherry.
,, *mahaleb*, Mahaleb Cherry.
,, *nigra*, Canada Plum.
,, *pennsylvanica*, Wild Red Cherry.
,, *salicifolia*, Willow-leaf Cherry.
,, *serotina*, Black Cherry.
,, *sphæocarpa*, West India Cherry.
,, *subcordata*, Pacific Plum.
,, *umbellata*, Black Sloe.
,, *virginiana*, Choke Cherry.
Pseudotsuga macrocarpa, Bigcone Pine.
,, *taxifolia* (Syn. *P. Douglasii*), Douglas Spruce.
Ptelea trifoliata, Hoptree.
Pyrus americana, Mountain Ash.
,, *angustifolia*, Narrowleaf Crab.
,, *coronaria*, Sweet Crab.
,, *ioensis*, Iowa Crab.
,, *malus*, Wild Apple.
,, *rivularis*, Oregon Crab.
,, *Soulardi*, Soulard Apple.
Quercus acuminata, Chinquapin Oak.
,, *agrifolia*, California Live Oak.
,, *alba*, White Oak.
,, *arizonica*, Arizona White Oak.
,, *Brittoni*, Britton Oak.
,, *brevifola*, Blue Jack.
,, *breviloba*, Durand Oak.
,, *Breweri*, Shin Oak.
,, *californica*, California Black Oak.
,, *Catesbæi*, Turkey Oak.
,, *Chapmanni*, Chapman Oak.
,, *chrysolepis*, Canyon Live Oak.
,, *coccinea*, Scarlet Oak.
,, *densiflora*, Tanbark Oak.
,, *digitata*, Spanish Oak.
,, *Douglasii* (California) Rock Oak.
,, *dumosa* (California) Scrub Oak.
,, *Emoryi*, Emory Oak.
,, *Engelmanni*, Engelmann Oak.
,, *Gambelii*, Gambel Oak.
,, *Garryana*, Pacific Post Oak.
,, *georgiana*, Georgia Oak.
,, *heterophylla*, Bartram Oak.
,, *hypoleuca*, White-leaf Oak.
,, *imbricaria*, Shingle Oak.
,, *laurifolia*, Laurel Oak.
,, *leana*, Lea Oak.
,, *lobata*, California White Oak.
,, *lyrata*, Overcup Oak.
,, *macrocarpa*, Bur Oak.
,, *marilandica*, Black Jack.
Quercus Michauxii, Cow Oak.
,, *minor* (*Q. obtusiloba*), Post Oak.
,, *morehus*, Morehus Oak.
,, *myrtifolia*, Myrtle Oak.
,, *nigra*, Water Oak.
,, *oblongifolia*, Blue Oak.
,, *palustris*, Pin Oak.
,, *phellos*, Willow Oak.
,, *platanoides*, Swamp White Oak.
,, *prinoides*, Dwarf Chinquapin Oak.
,, *prinus*, Chestnut Oak.
,, *pumila*, Barren Oak.
,, *reticulata*, Netleaf Oak.
,, *rubra*, Red Oak.
,, *texana*, Texan Oak.
,, *Toumeyi*, Toumey Oak.
,, *tridentata*, Trident Oak.
,, *undulata*, Rocky Mountain Oak.
,, *velutina*, Yellow Oak.
,, *virginiana*, Live Oak.
,, *Wislizeni*, Highland Oak.
Reynosia latifolia, Red Ironwood.
Rhamnidium ferreum, Black Ironwood.
Rhamnus caroliniana, Yellow Buckthorn.
,, *crocea*, Evergreen Buckthorn.
,, *Purshiana*, Cascara Buckthorn.
Rhododendron catawbiense, Catawba Rhododendron.
,, *maximum*, Great Rhododendron.
Rhus copallina, Dwarf Sumach.
,, *hirta* (Syn. *R. typhina*), Staghorn Sumach.
,, *integrifolia*, Western Sumach.
,, *metopium*, Poisonwood.
,, *vernix* (Syn. *R. venenata*), Poison Sumach.
Robinia neo-mexicana, New Mexican Locust.
,, *pseudacacia*, Locust.
,, *viscosa*, Clammy Locust.
Salix amygdaloides, Almond-leaf Willow.
,, *Bebbiana*, Bebb Willow.
,, *Bonplandiana*, Bonpland Willow.
,, *cordata lutea*, Yellow Willow.
,, *discolor*, Glaucous Willow.
,, *fluviatilis*, Longleaf Willow.
,, *Hookeriana*, Hooker Willow.
,, *Lævigata*, Smoothleaf Willow.
,, *lasiandra*, Western Black Willow.
,, *lasiolepis*, Bigelow Willow.
,, *lucida*, Glossy-leaf Willow.
,, *missouriensis*, Missouri Willow.
,, *nigra*, Black Willow.
,, *Nuttallii*, Nuttall Willow.
,, *occidentalis longipes,* Longstalk Willow.
,, *piperi,* Piper Willow.
Salix sessilifolia, Silverleaf Willow.
,, *sitchensis*, Silky Willow.
,, *taxifolia*, Yewleaf Willow.
,, *Wardi*, Ward Willow.
Sambucus callicarpa, Redberry Elder.
,, *glauca,* Pale Elder.
,, *mexicana,* Mexican Elder.
Sapindus marginatus, Wild China.
,, *saponaria*, Soapberry.
Sapium sebiferum, Tallow-tree.
Sassafras sassafras, Sassafras.
Schæfferia frutescens, Florida Boxwood.
Sequoia sempervirens, Redwood.
,, *Washingtonia* (Syn. *S. gigantea*), Big Tree.
Sideroxylon mastichodendron, Mastic.
Simarouba glauca, Paradise-tree.
Sophora affinis, Sophora.
,, *secundiflora*, Frijolito.
Swietenia mahagoni, Mahogany.
Symplocus tinctoria, Sweetleaf.
Taxodium distichum, Bald Cypress.
Taxus brevifolia, Pacific Yew.
,, *floridana*, Florida Yew.
Terminalia buceras, Black Olive-tree.
Thuja occidentalis, Arborvitæ.
,, *plicata* (*T. gigantea*), Giant Arborvitæ.
Tilia americana, Basswood.
,, *heterophylla*, White Basswood.
,, *pubescens*, Downy Basswood.
Toxylon pomiferum (*Maclura*), Osage Orange.
Tsuga canadensis, Hemlock.
,, *caroliniana,* Carolina Hemlock.
,, *heterophylla* (Syn. *T. mertemsiana*), Western Hemlock.
,, *mertensiana* (Syn. *T. Pattoniana*), Black Hemlock.
,, *mertensiana Hookeriana,* Hooker Hemlock.
Tumion californicum (Syn. *Torreya californica*), California Torreya.
,, *taxifolium* (Syn. *Torreya taxifolia*), Florida Torreya.
Ulmus alata, Wing Elm.
,, *americana*, White Elm.
,, *crassifolia*, Cedar Elm.
,, *pubescens* (*U. fulva*), Slippery Elm.
,, *racemosa,* Cork Elm.
Umbellularia californica, California Laurel.
Ungnadia speciosa, Texas Buckeye.
Vaccinium arboreum, Tree Huckleberry.
Vauquelinia californica, Vauquelinia.
Viburnum lentago, Sheepberry.
,, *prunifolium*, Nannyberry.
,, *rufotomentosum*, Rusty Nannyberry.
Xanthoxylum clava-herculis, Prickly Ash.
,, *cribrosum*, Satinwood.
,, *fagara*, Wild Lime.
Zygia brevifolia, Huajillo.
,, *flexicaulis*, Texan Ebony.
,, *unguis-cati*, Florida Catsclaw.

FLORA

AND SYLVA.

Vol. III. No. 33.] DECEMBER, 1905 [Monthly.

TO OUR READERS.

Flora and Sylva *has hitherto been published at less than its actual cost, with a view to putting little pecuniary bar to its circulation. It is now clear to us that a serial of the kind, done in the best way as regards illustrations, paper, and printing, does not appeal to a sufficient number of readers to justify its being issued as a monthly magazine. But we have many sympathetic readers and do not mean to desert them, so that while with this year* Flora and Sylva *will cease to be issued as a magazine, for the future it will be published as a YEARLY VOLUME. In this way we shall have certain advantages in* (1) *more even printing;* (2) *a more varied assortment of hand-worked plates;* (3) *more work of lasting value, with greater freedom in being able to treat each subject in due proportion to its value. Our aim will be the figuring and describing of new and important plants, trees, and shrubs, wholly from the point of view of the planter and gardener, without trade influence or bias of any kind. The yearly volume of* Flora and Sylva *will be issued to booksellers in the autumn of* 1906, *and will be precisely as heretofore save that it will appear in volume form only.*

WHO IS TO LAY OUT THE GARDEN?

Cottage, farm, and manor gardeners, have good reason to be happy that the need for making the most of their space prevents any office-plans being used, and the simple lines they are compelled to adopt are a great source of beauty. It is when we get to places of any size that the question arises, who is to lay out the garden? I say that he who knows the ground best can always do best in the planting of a country place. But for various reasons many people cannot face the problem unaided, and in the present state of things they are very likely to get into trouble even when help is sought. For there is no organised profession to help: anyone may call himself a landscape gardener; a navvy who has had some experience of walk and road-making, a jobbing gardener, men wholly without training will undertake the work, and many nurserymen advertise themselves as landscape gardeners, their own work being the wholly different one of growing trees and shrubs and plants into the best state for planting.

There are even a few architects who offer to lay out gardens, though their training is for different work. In France the landscape gardeners retort by taking lessons in architecture, and whenever they can they build the house as well as lay out the grounds. In America, where the profession of landscape gardener is taking an organised shape, landscape gardeners are debarred from undertaking other work—a wholesome rule, as poaching on other's preserves is harmful in many ways. But even out of these confusing elements a man of genius arises now and then, like the late Robert Marnoch and F. L. Olmstead, and there are some good landscape gardeners in practice.

How are we to know a good one? By this among other signs, that he will study the ground thoroughly first, and bring no plan in his pocket. He should work on the ground itself and be able to show, by the aid of a few sticks, what his notions are as regards the ground near the house and the flower-garden. Paper plans are a feeble substitute for the thing itself, but the custom of planning out is so fixed that it is not easy to get this truth accepted. One day I was considering the site for a flower-garden—there was a beautiful lake below, at just a good distance, with other advantages to be thought of and brought into relation with the proposed flower-garden—I was called into the house to see a wretched plan of the ground, which showed me nothing but a few bare lines. Plans are essential for busy men in offices, but the man who would make the best of his ground can do better without any plan but such as he marks out on the ground itself.

Let it be remembered always, by those who care for the beauty of a country place, that the plotting out of the ground about the house is but a small part of the work that has to be done. It is only when we get clear of the parts near the house that the permanent planting of the place—breadth, variety, and the bigger questions—really comes in, and here it is certain that no good work is possible without knowledge of the trees of our own country and the hardy trees and shrubs of northern lands. We may lay it down as certain that there can be no true work in landscape gardening save by one who knows these by heart, and there is no royal road to that save a life's study. We are not now like the old Dutch, who had one or two native trees to hack into green walls, but are rich with the trees of three continents. It is surely clear therefore that what we want is naturalists and artists, and not mere artificers who work with dead materials.

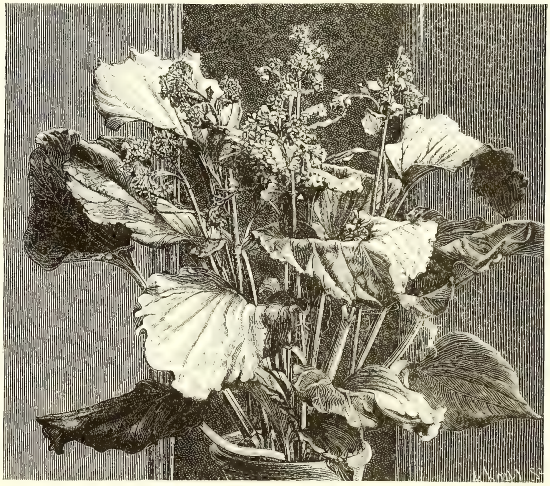
In all important work there should be a professional man who should have nothing to do with the nursery trade beyond controlling it, who should receive no commissions from anyone but his employer, and who should have the same power to reject unsuitable material that a good architect has and uses at his own discretion.

The relation of nurserymen to garden design is a delicate one. A nurseryman's business is a wholly distinct and very useful one, but if he does his own work well he has not the time or the knowledge to act as a professional man, and where is the control which should be exercised in all extensive work—by someone independent of the tradesman? No, the nursery should be the source of our good supplies, but not of design, or we shall never get very far away from the mixed muddle now characteristic of planting generally, arranged at first on the model of the show-border in a nursery—Pines of giant race set out with bushes, and forming a verdant border pleasing to the nursery mind. But the same system of planting carried out in private places, ends in hideous failure.

The lesson of all this is, that although there is nothing so good as wise professional advice when we can get it, the best results and the most distinct on the whole, are for those who study their own ground. A fact which throws a light on this point is, that in colonies and in certain islands where there are no office plans handy, people have to think for themselves and the result is more beautiful than can be got in any settled country, the gardens being quite distinct one from the other; and so it should always be. W. R.

THE NEW-ZEALAND FORGET-ME-NOT (*Myosotidium nobile*).

This plant makes a fine picture in many a Cornish garden during the month of May, while bearing its spreading blue flower-heads. It owes its introduction to Cornwall to Mr. John Enys, of Enys, who many years ago brought home seeds. At Enys there is a painting showing the plant in its native home at Chatham Island (400 miles east of New Zealand), where it fringes the sea-beach just above high-water mark with a long line of blue. It grows in the sea-sand and so near the waves as to be drenched with wind-borne spray. Mr. Enys tells me that the plant is fast being exterminated at Chatham Island by cattle, which now overrun the shore. It will not endure many degrees of frost, and was therefore for many years treated exclusively as a greenhouse plant in this country. Its culture in the open air is thus confined to gardens with a mild climate, and even in Cornwall a winter protection of Fir branches is often given.



A Pot-grown Plant of Myosotidium.

In the best forms the flowers are a uniform blue; in others the centre is deep blue margined by paler colour, with occasionally a trace of pink on the petal; and there is also a pure white variety. Sea-sand is used in planting, in some gardens mixed with sandy loam and leaf-mould, with a mulching of pure sea-sand, and in others, such as Menabilly, sea-sand alone is used. There wide and deep holes are dug, the cart sent to the beach, and the holes filled with sand, after which the plants are put in place. I never have seen finer plants than these, some being fully 3 feet in height, with bright green, deeply-ribbed and glossy foliage, almost as large as Rhubarb leaves. One leaf was 2 feet in length and over 18 inches in width. With me plants have also made fine growth in 3 feet of pure sea-sand. At Menabilly the plants are grown against high walls with varying exposures, but they are less satisfactory when facing due south than in other aspects. I at one time grew plants immediately in front of a south wall, and found that the leaves flagged badly on hot days. While this excessive heat from a south wall should be avoided, a shady place is also unfavourable. Large plants of 9 to 12 feet in circumference will throw up dozens of flower-heads, some of these 6 inches or more across, while the individual blossoms are about half-an-inch in diameter. Such masses are a picture while at their best, though the flowers are soon over, giving place to large four-winged seeds, and self-sown seedlings may often be seen springing up around the old clumps. After attaining full size the plants rarely retain their vigour for more than three years, when they begin to dwindle and are replaced by seedlings, which flower in their third season. S. W. FITZHERBERT.

The culture of the Myosotidium is not often attempted save in the south-west, but with care it will grow well in the colder parts of the country, in pots or planted out under glass. For the sake therefore of completing Mr. Fitzherbert's interesting note, we furnish brief directions from those who have succeeded with it under these conditions. Wintered while small in a cool greenhouse, at the end of March the little plants may be repotted and plunged in a cold frame, which can be well matted up in case of frost, while allowing of free ventilation at other times. As the weather gets warmer the lights may be left wide open, the plants freely watered and syringed overhead during warm weather, with a light shading from fierce sun-heat. The soil should be very sandy and not too rich, or a rank coarse growth results, but, from the time that the flower-spikes begin to show, liquid manure may be given with benefit. Neglect of watering or too dry an atmosphere means greenfly, and sudden death to the plants. Messrs. Backhouse of York have flowered it well, grown on a raised mound in a cool greenhouse, the care being to maintain at all times a moist cool atmosphere, and perfect cleanliness.

OLEARIA (DAISY-BUSH).

This is a family of evergreen shrubs and small trees found in Australia and New Zealand, some of which are most handsome. They are best described as shrubby Asters, producing flowers similar to the perennial "Michaelmas Daisies" of North America, and interesting from the fact that the largest of the Olearias are among the only *composite* trees known to us. There are many kinds in Australia and in New Zealand, to say nothing of a few species confined to Lord Howe and Chatham Islands, but not a single species is common to the two main groups. Numbering upwards of 80 species, they are exceedingly variable in habit, appearance, beauty of flower, and conditions of growth. Many come from a considerable elevation and are able to withstand several degrees of frost, but even these little mountain shrubs are mostly too tender for the open air in this country, except on the south coast, and in the south-west of England and Ireland. The best-known kind, *Haasti*, is hardy at the root almost anywhere, and another 3 or 4 species succeed fairly well upon sheltered walls, when given protection in severe weather. A few kinds do well in pots and under glass, but others are harder to please, and none will bear coddling. They thrive best in light well-drained soils with some admixture of peat, and are averse to moving, and mostly dwindle in soils that are at all strongly charged with lime. The best-known and most beautiful kinds are named as follows :—

O. angustifolia.—Said to be only inferior to *O. insignis.* Its flowers are white with a violet disc, very fragrant, and with ray-florets wider and more prominent than in any other kind. The leaves are stiff, deeply toothed, and white beneath.

O. argophylla.—An Australian species bearing the name of Musk-wood in Tasmania and New South Wales, and formerly known in gardens as *Aster argophyllus.* It makes a handsome shrub when well established, with woolly leaves scented with musk, 6 inches in length and 2½ in breadth, toothed at the edges, and covered with a mealy down of silvery appearance. The small, star-like, creamy-white flowers appear as great hanging clusters, but are not very attractive. In Cornwall the plant has attained a height of 30 feet, and it is fairly hardy against walls in the warmer parts of Britain and even around London, growing again from the root when cut to the ground by frost. There are large plants of it under glass at Kew, and it is sometimes grown in this way in colder districts for the sake of its leaves, which scent the air after rain and keep their fragrance when dried. It is one of the most easily increased kinds, either by seed or cuttings, and grows rapidly and to such a size in its own land, that the sweet-smelling wood is used in cabinet-work.

O. chathamica.—This forms a neat bush and bears white Daisy-like flowers with a dark purplish, almost black, centre.

O. Colensoi.—Stated in Kirk's "Forest Flora of New Zealand" to be "known as the Muttonwood from the great strength and toughness of its branches, combined with its dense habit of growth. It forms scrub through which a passage can only be forced with a great amount of labour." It is reported to grow to a height of 40 feet in its own land. Though its foliage is handsome, the fact that its dark purple flowers are rayless, would reduce its value as a garden shrub.

O. Cunninghamii.—This is said by colonists to be very beautiful when in bloom, about Wellington, during August and September. It grows to a large size, lighting up the bush with its great heads of silvery-white flowers, somewhat like those of *macrodonta* but almost dazzling in their purity.

O. dentata.—This has often been confounded with *O. macrodonta* but is quite distinct, the latter being a native of New Zealand, whereas this is from New South Wales. Its flowers are over an inch across and are borne in terminal racemes. The ray-florets are white tinted rose and curve upwards, thus forming a cup-shaped flower with a bright yellow centre. The leaves are very variable in shape, about 2 inches long, bluntly rounded, and crisped at the edges ; while, except on the upper side of the leaves, the whole plant is covered with rusty-brown tomentum. It is a tender species, having perished at Kew when seemingly fully established against a warm wall, but it does well in the Isles of Scilly. In Australia a variety is said to exist in which the flowers are prettily shaded with blue.

O. Forsteri.—A scarce shrub in this country though perhaps better known on the continent, where it has passed under several names, such as *Olearia paniculata* and *Elæagnus crispa.* The last name is due to the beautifully crisped leaves of bright yellowish-green, smooth and shining above and covered with grey felt underneath and upon the stems. It makes a pretty evergreen, freely branched and of fine habit without clipping—to which indeed it is averse. It is a good sea-side shrub, fairly common in the milder parts of Brittany, in the south of France, and round Dublin. It has reached a height of 10 feet with Lord Annesley at Castlewellan, but is there found somewhat tender. The dusky-white flowers appear in November and December and are fragrant, but insignificant. Of quick growth and easy increase, it is much used in New Zealand as a shelter tree.

O. furfuracea.—A low tree of 10 to 15 feet, with broad crisped leaves and large loose clusters of tiny white flowers, too small for effect. Syn. *O. ferruginea.*

O. Gunniana.—This has been confused with *O. stellulata* and the same plant has long passed under both names in gardens, but the true *Gunniana* is quite distinct. It is a low much-branched shrub, with small toothed leaves of silvery grey colour, less hardy than *stellulata*, and later in flowering. The white Daisy-like flowers are smaller, of greater substance, and more cupped than in that kind. Possibly not now in cultivation. The plant figured in the *Botanical Magazine* as *O. Gunniana* is undoubtedly *O. stellulata.*

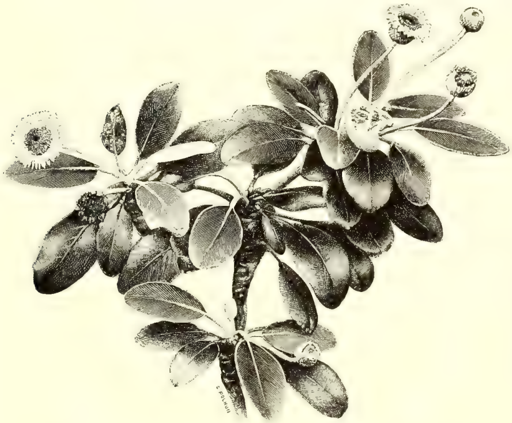
O. Haastii.—This is the commonest and hardiest of the Olearias, a splendid sea-side shrub in the most exposed places and even when deluged with salt spray, and almost as good in town gardens. Its leaves are Box-like, being small and tough, ovate in shape and about an inch long, deep green above and white on the under side. Towards the end of the summer it is completely covered with a profusion of small white flowers (not unlike those of the Achillea or Millfoil), which last a long while in dry weather, and are pleasantly fragrant. So free is it that cuttings a few inches high are often covered with flowers. In New Zealand the plant occurs as a low shrubby tree at elevations of about 4,000 feet, and though in this country it does not seem to exceed 8 feet in height, plants continue to spread almost indefinitely, one specimen in the collection of the Earl of Annesley at Castlewellan being well over 50 feet in circumference. It is so hardy that in a warm soil and with slight protection it succeeds in many parts of northern Britain, and though cut to the ground in many places by the severe frosts of ten years ago, the plants grew again in almost every case. In cold places a light soil is to be recommended, and the withered flower-heads should be left on all winter as a protection to the tender shoots. It makes a good hedge plant, and grows well even in the shade of trees. It is sometimes recommended as a covert plant, but rabbits are too fond of it for it to be of any value in this way. Readily increased from cuttings of the weaker side-shoots, taken during summer.

O. ilicifolia.—This has been often confounded with *macrodonta*, but has longer, narrower, and more deeply toothed leaves, with strangely crinkled and serrated edges. The entire plant also is far less downy, indeed at times almost glabrous. The flowers appear as rounded clusters during June, and are almost identical with those of *macrodonta*, with an agreeable aromatic fragrance. The plant is widely distributed in the mountains of New Zealand, and is fairly hardy in this country.

O. insignis.—This is undoubtedly the finest of the race. It is a rare plant in this country and up to the end of 1904 I have only personally known four plants in the open, but in the present year two more have been imported from New Zealand. It is a native of the middle island, where it grows in crevices of dry rocks at an elevation of 5,000 feet. Its leaves, which are leathery and of great consistence, are from 4 to 6 inches in length and about 3 inches across. The young leaves are clothed with pale fawn-coloured or whitish tomentum on both sides, this eventually disappearing from the upper surface which becomes green, but remaining on the reverse. The stout branches and peduncles are covered with the same felt. The flowers, which are borne on erect axillary or terminal peduncles of 6 to 9 inches, have silvery-white ray-florets and a yellow disc, and measure 2½ to 3½ inches across. It is a scarce plant in its own country, where it is said to attain a height of about 3 feet. The finest example known to me in this country is that growing in Mr. W. E. Gumbleton's garden at Belgrove, Queenstown, here illustrated. It has flowered at Kew under glass, but is a very slow grower and never quite happy in pots. It has also flowered well with Canon Ellacombe at Bitton near Bristol.

O. Lyallii.—A scarce New Zealand species, with very dark purple flowers.

O. lyrata.—A species with dull white flowers, hardy in the south of Ireland save in the severest winters.



Olearia Insignis.
Engraved for "Flora," from a photograph sent by Mr. W. E. Gumbleton, Belgrove, Queenstown.

O. macrodonta.—This makes a very attractive shrub in the south-west, having in some gardens attained a height and diameter of over 10 feet. This is still far less than its height in New Zealand, where it occurs as a low tree of 20 feet or more, with a flatly rounded head, and a considerable woody trunk. In this district it flowers towards the end of May, and somewhat later in colder places, and is then covered with flat, much-branched clusters of small white flowers with a reddish eye, and sweetly scented. The leaves are Holly-like, silvery-green above and white on the under surface, with a smell of musk when bruised. In hardiness this kind is second only to *Haastii*, of rapid growth, and so full of flower that the branches are often borne down by the weight. In New Zealand it is a favourite hedge-plant.

O. moschata.—Bears small white flowers of no particular beauty, and has leaves half an inch long and a quarter of an inch broad, grey-green above and white beneath, with a strong scent of musk. A tender species in this country, but so stout and vigorous in New Zealand as to be recommended for shelter-belts.

O. myrsinoides.—An Australian species long known as *O. ilicifolia* and still sold on the continent under that name. It varies a good deal in habit but is commonly seen as a weakly straggling shrub, with small toothed leaves and a thin scattering of greenish-white flowers, of little beauty. It is fairly hardy against a wall, but is the least desirable of all the kinds in cultivation.

O. nitida.—This is a pretty shrub, flowering in May, and bearing bunches of small white flowers with a bright yellow centre, about half an inch in diameter. It is a quick grower and a profuse bloomer, a plant in my garden this year being so covered with flower that scarcely a leaf could be seen. Its leaves are 3 inches long and 2 inches wide, deep green above and white beneath. In New Zealand it reaches the size of a small tree, at elevations of 4,000 feet, but so far its height in this country has not exceeded 4 or 5 feet.

O. nummularifolia.—This bears solitary creamy-white flowers in July, and has very singular foliage quite unlike that of any other species. The thick and almost stemless leaves which crowd the shoots like scales, are a quarter of an inch long and rather less in breadth, green above and white or yellowish beneath, where the edges are rolled inwards. It grows as a spreading shrub or low tree, with stout and clammy branches, of a pretty golden colour while young. It is hardy in many parts of the country, even into the south-west of Scotland, but young plants need protection.

O. operina.—This comes very near to *O. chathamica*, but is not so good a plant; flowers white with a yellow disc.

O. ramulosa.—A very distinct and beautiful species from the mountains of Tasmania and New South Wales, and consequently nearly hardy in this country, though from its season of flower it cannot be recommended for the open air except in the warmest parts. The leaves are very small and thickly clustered, narrow, green on the upper surface and covered with white felt beneath. The flowers appear late in the autumn as beautiful half-pendulous clusters of starry white, upon gracefully arching shoots. They last so long as to be valuable for cutting, or to be grown in pots for the autumn decoration of the cool greenhouse and conservatory. In most gardens it is safest in this way, for though hardy enough to stand a series of mild winters in the open, if planted in dry soils and at the foot of a warm wall, a sharp winter is fatal to it. It attains a height of 5 or 6 feet and should be left to grow freely in its own way. This charming little shrub appears to have become scarce in British gardens, though being easily raised from seed there should be no difficulty in reintroducing it.

O. *semi-dentata.*—This is a very beautiful species, and a native of Chatham Islands, where it grows in boggy ground and bears deep rosy-purple flowers which become a much deeper purple under cultivation. Some of the wild forms bear flowers that are white, just tipped with purple at the edge of the florets. This kind has not yet been introduced, and seed that has been received has not germinated. It is beautifully figured by Mrs. C. Hetley in her "Illustrations of the New Zealand Flora," plate 2.

O. *stellulata.*—In gardening works this shrub is generally held to be synonymous with O. *Gunniana*, but the latter is quite distinct, as may be seen from our description of it. In the south-west *stellulata* flowers early, being at its best in May, while its first blossoms often expand in April. In other parts of the country it flowers about a month later. Its leaves are narrow, about an inch long, deep green on the upper side and whitish beneath. Although this species rarely presents the unbroken sheet of white that O. *Haastii* does, its larger and more starry flowers are freely produced on the branching shoots and the plant, having a graceful habit, makes a charming picture, especially in large specimens 6 feet or more in height. It is fairly hardy even into Scotland, if planted against a sheltered wall, but even with protection it is liable to injury in a cold winter. Being readily increased however, and quite happy in a cool greenhouse, pot-plants should always be held in reserve and prove exceedingly useful in early spring, when the flowers may be hastened by a little heat. It is a native of Tasmania and New South Wales.

O. *Traillii.*—A New Zealand species coming near *angustifolia* and so nearly intermediate between it and *Colensoi* that it has been suggested as a natural cross between the two. The purple and white flowers are like those of *angustifolia* but less brilliant, and the foliage like *Colensoi* but a trifle smaller. It is not yet in cultivation in this country.

O. *Traversii.*—A rare and interesting tree, hardy only in the most favoured parts of Britain. It comes from the Chatham Islands, of which it is the most valuable tree, reaching a height of 35 feet, and known as the Bastard Sandalwood Tree. It branches freely from a stout trunk, bearing oval-shaped leaves of about 2 inches, smooth shining green on their upper surface, whereas elsewhere the plant is everywhere covered with white silky down. The flowers come freely enough towards the end of summer, bursting from the tips of the shoots and from the leaf axils, but they are small and of an inconspicuous creamy-white colour. Plants have flowered in the warmest parts of Ireland, but save in such favoured places it can only be grown in the open air as at Kew, against a sheltered wall, with protection in winter. Of strong free growth, it is valued in New Zealand as a shelter-tree. S. W. FITZHERBERT.

NEW AND LITTLE-KNOWN LILIES.*

NOT the least interesting feature of our fuller knowledge of Chinese plants lies in the number of new Lilies discovered. Indeed, it has been proved that Central and Western China is really the headquarters of the genus. Of 38 species and varieties of Lily recorded from China, no fewer than 26 are from the Central and Western Provinces, the majority of these being comparatively new, and

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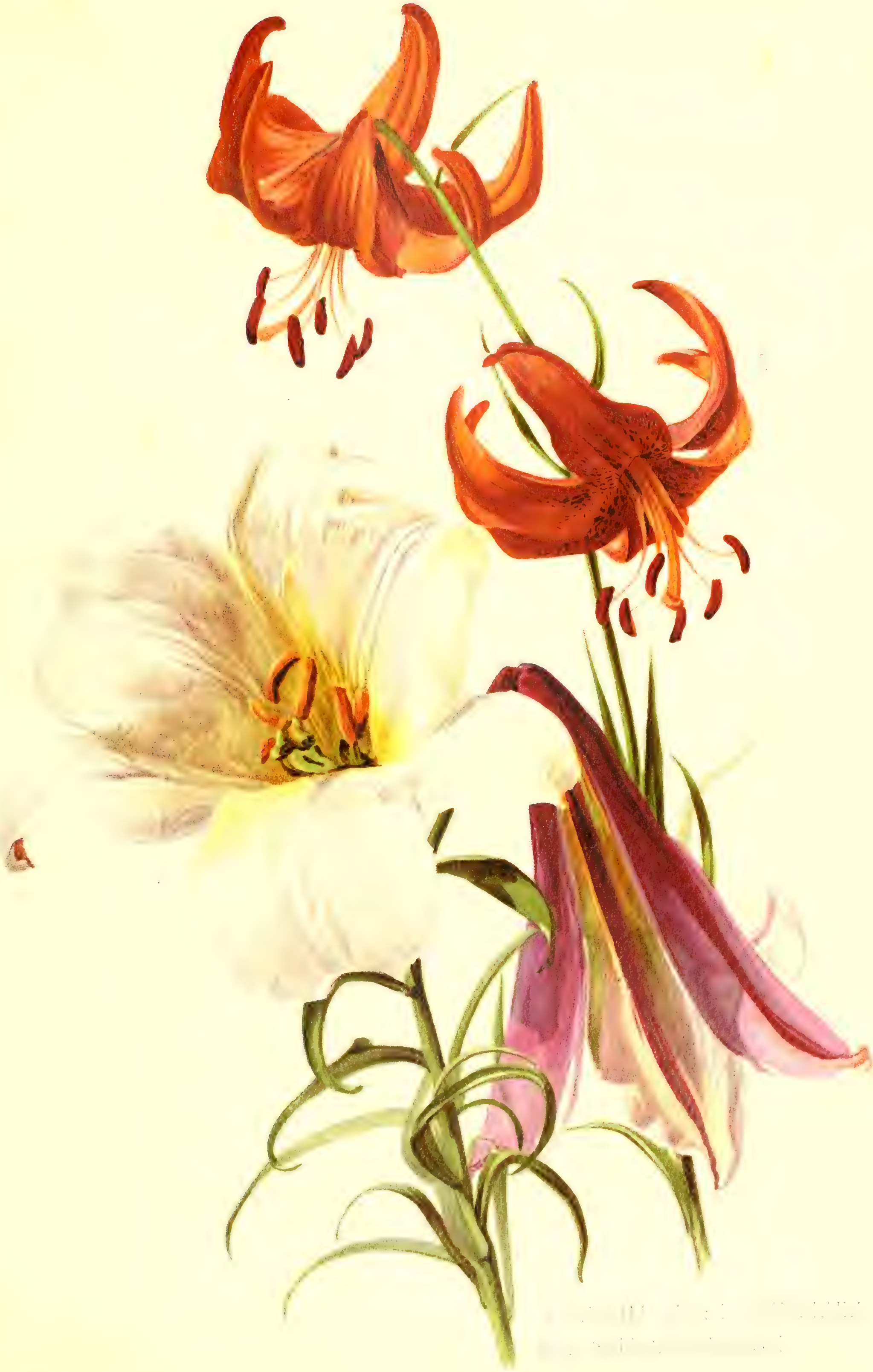
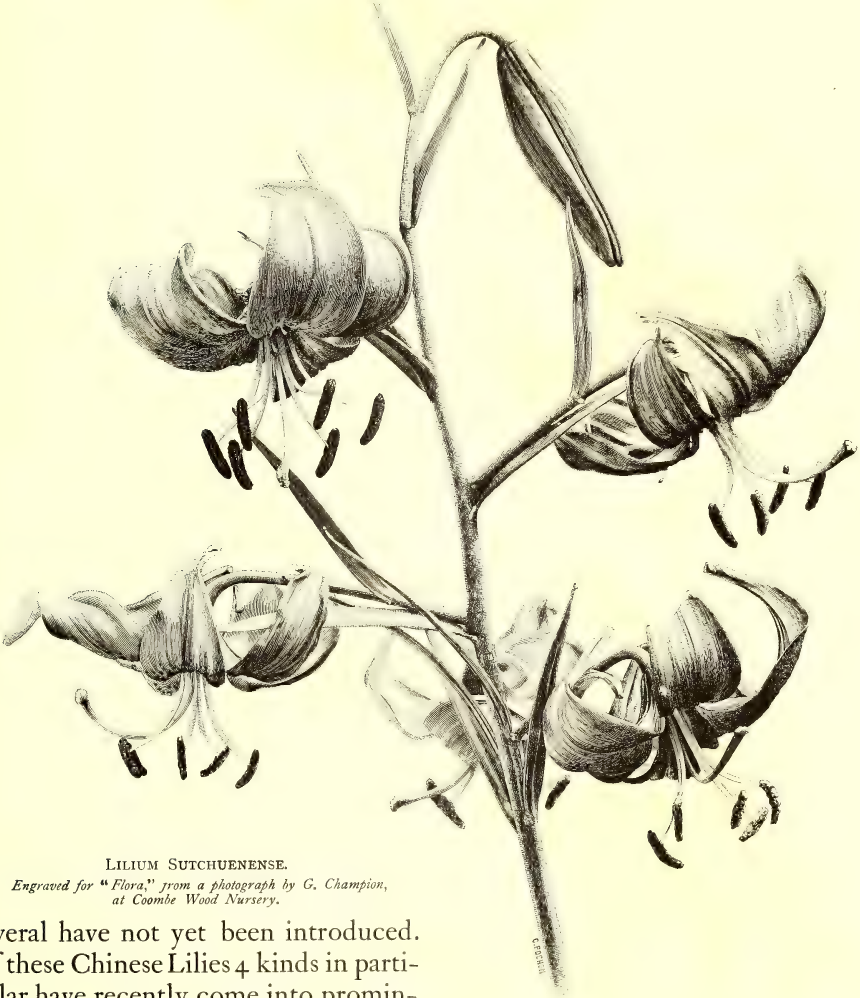
* With coloured plate from a drawing by the late H. G. Moon.





Lilium Sutchuenense.
Engraved for "Flora," from a photograph by G. Champion, at Coombe Wood Nursery.

several have not yet been introduced. Of these Chinese Lilies 4 kinds in particular have recently come into prominent notice. Two of these—*L. Duchartrei* and *L. myriophyllum*—are quite new and flowered for the first time in Europe during the past summer. Of the remaining couple, *L. Bakerianum* is very rarely seen in gardens, though it was introduced and flowered by Messrs. Low in 1889; whilst *L. sutchuenense*, the fourth, flowered at Kew in 1899, but until now has never been seen elsewhere. A stock of all these kinds was sent by the writer from Western China to Messrs. Veitch of Chelsea, to whom the artist was indebted for the flowers which form the subject of the coloured plate. This shows *Lilium myriophyllum* and *L. sutchuenense:* a detailed account of the other two kinds is held over to appear with a second plate in a future issue of Flora. A melancholy interest attaches to these plates, as being the last drawings made by Mr. Moon before his death.

L. sutchuenense.—This species is common on the rocky grass-clad mountain slopes of the Chino-Tibetan border, between 7,000 and 9,000 feet. It is also frequently cultivated in these regions by the peasants, on the tops of walls and the roofs of their houses, the bulbs being cooked and eaten. This fact is interesting, the only Lily-bulbs hitherto known to be eaten by the Chinese being those of *L. tigrinum.* A good idea of this Lily may be obtained by likening it to a miniature form of the old Tiger Lily, but with no bulbils, narrower leaves, and flowers on very long horizontal stalks. The plant first flowered at Kew in July 1899, having been received from Messrs. Vilmorin, to whom Père Farges sent seeds. In 1904 the writer sent home to Messrs. Veitch a quantity of bulbs which flowered freely during the past summer, plants being exhibited before the Royal Horticultural Society in July last, which gained an award of merit. The elegant foliage and brilliant flowers found many admirers. It is too early to speak with certainty, but so far as one can judge the plant promises to stay with us. The flowering habit of this graceful plant is seen in the engraving over-leaf—page 329.

Bulb small, flattish-ovoid, white slightly tinged with pink. Stems 1½ to 3 feet, densely pilose, with tufts of cottony hairs in the axils of the leaves. Leaves very numerous, linear, prominently one-nerved, this nerve scabrid below; margins toothed and scabrid; whole leaf puberulous and covered with crystalline dots. Stems, for 6 to 8 inches below the flowers, naked save for one or two scattered leaves. Flowers racemose, 1 to 18, small, in shape like *L. tigrinum.* Colour bright scarlet, with black spots which are more abundant in the lower half of the segments. These spots vary greatly in numbers and are occasionally wanting. Flower stalks 3 to 6 inches long, horizontally spreading, each bearing one (rarely more) leaf-like bract. Flower buds more or less covered with white fluffy hairs, especially while young. Stamens, filaments, and style tinged with red; anthers at first same colour as flowers, becoming slightly darker as they mature; stigma simple, chocolate-brown.

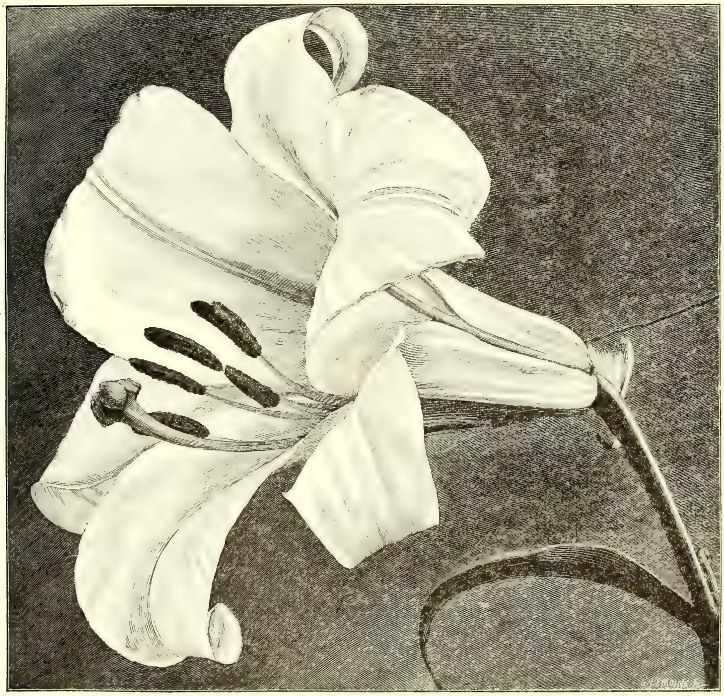
Lilium myriophyllum.—This new and handsome species is allied to *L. leucanthum,* from which it is distinguished by its narrow one-nerved leaves densely crowded on the stems, and the absence of bulbils. The flowers also present minor differences. This species is common on rocky scrub-clad mountain sides in Western China, between 3,000 and 6,000 feet. It is an especial feature of some of the warm dry river-valleys of the Chino-Tibetan border, and is the handsomest of the *Brownii* group. A full-sized bloom of *Lilium myriophyllum* is well shown by the engraving upon the opposite page.

Bulbs large, purple, and similar to those of *L. leucanthum.* Stem stout, 1½ to 5 feet, greyish-green, very densely clad with leaves. Leaves linear-oblong, acuminate, 2 to 5 inches long, recurved, with the single nerve usually hispid on the underside. Leaves immediately below the flowers whorled, and elliptic-lanceolate in shape. Inflorescence umbellate. Flowers large, fragrant, funnel-shaped, 5 to 6 inches long, horizontally disposed: marked with purple after the manner of *L. Brownii* on the outside; inside of tube canary-yellow for two-thirds of its length, and the rest of the flower of the purest white. Stamens and pistil equal in length and reaching to the mouth of the corolla. Stamen filaments pilose in the lower half; anthers golden.

E. H. WILSON.

SOME BRITISH ALPINES.

Despite the vast number of Alpine plants that have reached us from the mountains of Europe, Asia, and America, there are few more beautiful and none more interesting than those found on our own rocks and fells. Beside their intrinsic charm these have a further claim as being our natural neighbours, though not always any the less exacting and capricious than their cousins from oversea. Many of these are well known, but a few notes on some of our rarer British plants may not be unwelcome. An excellent garden might indeed be made, containing only native species whose garden value has never been sufficiently recognised. In such a garden, beside the more showy things, such as *Gentiana verna*—which we share with the great mountain ranges of Europe—we should have many fascinating little plants whose charms are apt to be overshadowed by newcomers from the uttermost "Back of Beyond." This is not to say that our mountain plants are peculiar to England, but, as natives, they have claims which have been obscured by those of highly-coloured yet often intractable aliens.



Lilium Myriophyllum.

Engraved for "Flora," from a plant at Coombe Wood Nursery.

Arenaria verna is a delightful tufted plant of the upper mountain-limestone (at least in the Craven Highlands), which has not been valued as it deserves. At all times of the year it gives pleasure, no less in winter when its comfortable little cushions gleam like a patch of emerald fur, than in early summer when it is starred with innumerable clear white flowers on their airy little stems. It is a plant of the simplest culture and the happiest effect, responding gratefully to one's appreciation without growing coarse or leafy. In a wild state, found near old lead-workings, it shows remarkable luxuriance.

Arenaria gothica is one of the rarest of British alpines, confined to some half-dozen spots high on the great limestone plateau that supports the mass of Ingleborough. Here it still lingers, a survival of the glacial period—assuming, that is, the falsity of certain suspicions as to its introduction with ballast from the far north. It is a small yet striking plant, minute, prostrate, and of straggling growth, with little ovate leaves of a deep glossy green. The flowers are large for the size of the plant—larger than those of *A. verna*—of fine, almost waxy texture, and a curiously intense snowy-whiteness. It is never found in other than poor rough ground, among chips and debris of the mountain-limestone, where the soil is little more than humus; and, like *Silene acaulis* and *Saxifraga oppositifolia*, it is the better for being starved. Otherwise its leaves and flowers come less refined in tone and texture, and the whole growth becomes rank. Grown in the moraine-garden, however, it keeps its true character and charm—this arising no less from its intrinsic beauty than from its extreme rarity and romantic interest.

Polygonatum officinale is also an uncommon native plant which has never received due consideration. It is a miniature Solomon's Seal, rarely exceeding a foot in height, and with only a pair or so of waxy bells in the axils of its leaves; the flowers, too, are much larger and more conspicuous than the bunched blossoms of *P. multiflorum*. *P. officinale* is neat and quiet for a rock-garden, where *P. multiflorum*, stout and riotous, would be out of place. It is also a true rock-plant, being found among the white limestone scars and high copses of Craven, in company with *Convallaria majalis*, though it has not borne the denudation of the hills as patiently as the Lily of the Valley, and prefers the undergrowth at the cliff's foot to the deep crevices of rock in which the Convallaria is found all across the wind-swept flats of the Upper Scar limestone.

Viola lutea is another neglected alpine plant, which occurs sparingly on Pen-y-gent and more abundantly on the eastern fells, till in Upper Teesdale it forms the main growth of the meadows, and ranges from pure yellow through an almost infinite variety of subtle tones to the deepest violet. As a rule, the Craven form bears flowers of soft clear yellow and, even in a wild state, these golden sparks are beautiful among the tough moorland grasses; but in cultivation it develops into a splendid dwarf tuft, crowded to concealment with its large and exquisite blossoms. Vain indeed is the labour spent in wrestling with the peevish caprices of *Viola cenisia* and other of her difficult sisters, when such a charming and contented little wildling is ready to hand. Indeed a large yellow form of *Viola lutea* might at a glance almost be taken for *V. Zoysi*, and a fine purple one for *V. calcarata*.

Primula farinosa is perhaps the best known of our British alpines, and is probably also the most brilliant. At the same time, ever since Parkinson's day it has laboured under a sorry reputation for uncertainty and intolerance, whereas, in a wild state, the plant is conspicuous for its vigour. Unlike its only English rival in beauty, *Gentiana verna*, it is rather a waxing than a waning species. Its distribution centres round the Craven highlands, with the adjacent fells of Cumberland and Westmorland. Outside this district it is less seen, but certainly here in Craven its area is increasing as well as its abundance. High barren scars, where ten years ago hardly a flower could be found, are now rosy in the spring, and in its lowland haunts it thrives so sturdily that a well-grown plant might be taken for a pink *P. capitata*, and little groups by the wayside are so brilliant and robust that one hesitates for a moment to recognise them as wild British plants. A curious little trait, betraying, perhaps, a memory of colder days when the blooming season had to be hurried on for fear of the glacial winter, is seen in its blooming earlier in high and exposed places than in low and sheltered ones. On the bare fells it is in flower three weeks sooner than on the rich railway cuttings in the valley below. Under cultivation, here at all events, it shows perfect contentment, with fine size and colour. From long experience of its favourite haunts one would conclude that the difficulty found in its culture arises, at least in part, from the belief that it is essentially a bog-plant. It *is* often found in bogs and wet places over the English mountains, but it is still more frequently found in places quite free of surface moisture. Among the wiry moor grasses on the Scar-limestone, on steep railway banks, on sun-baked unwatered slopes, the "Pretty Bird-E'en" is no less abundant, no less vigorous and bright than in the marshes which are supposed to be necessary for its very existence. Clearly then, it depends rather on rain for its sustenance in these parts. This might lead one to try, in other districts, the effects of a dry sunny position in rich cool soil, with abundance of water all through the late summer and autumn, but only the necessary protection against drought through the blooming season. Further, under cultivation the plant has a tiresome trick of emerging from the ground in winter and flourishing white roots in the air. This must be corrected, and then our lovely little Primula may perhaps thrive under altered conditions at least as well as in the elaborately waterlogged marshes of southern gardens, where it so soon pines away,—as much, probably, from excess of moisture, as from nostalgia of the fresh alpine air of its native hills.

Primula farinosa alba.—This exquisite little plant was known even in Parkinson's time, and described in the *Paradisus* with all that author's delightful accuracy, though under an elaborate and long superseded name. Since his day, however, though often enough catalogued, the true plant has seemed almost mythical, the specimens offered mostly showing on minute inspection hardly perceptible traces of lilac colouring which, perhaps with one season of cultivation developed into a healthy pink. Some writers have thus been tempted into denying the existence of a true white *farinosa*, classing all so described as mere anæmic and temporary lapses. In the course of many seasons' search in all our neighbouring stations, I have found only an occasional albino here and there, and even these, when closely viewed showed traces of colour sufficient to invalidate their claim to be Parkinson's *farinosa alba*. But this year all doubts have been set at rest by a neighbour's discovery of first one, then a dozen, and finally more than a hundred pure white Bird's Eyes, all growing in one field. That this is the genuine plant there can be no doubt; its tone is free from any suggestion of colour, and it accurately answers Parkinson's description in the matter of increased size, golden eye, and so forth: above all, its constancy is proved by the frequent presence round a snow-white mother-plant, of half a dozen snow-white babies. It appears not only faithful to its parentage, but vigorous and willing in growth, giving promise of a great addition to the Garden of British Alpines.

REGINALD FARRER.

Ingleborough, Lancaster.

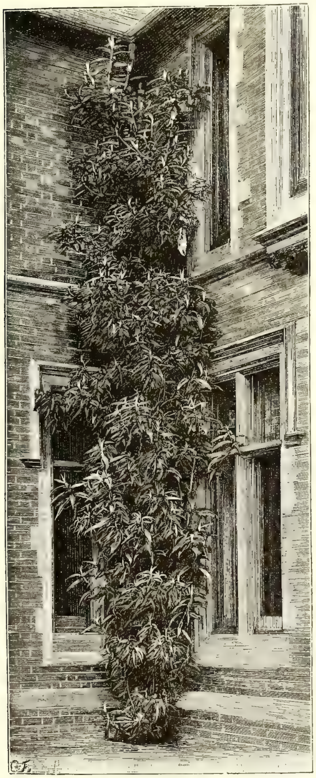
Griselinia Fruiting. — To Mr. Chas. R. Hamilton of Hamwood, Dunboyne, Co. Meath, we are indebted for the following interesting note :—" I see in the September number of Flora it is said that the berried fruits of Griselinia are never seen in this country. I have two trees about 10 feet high, at some distance from each other, one of which is now covered with berries, while the other never bears any. I believe one is a male and the other a female plant of *G. littoralis.*" In a subsequent letter our correspondent adds that the same tree ripened its seed last year, and a number of seedlings came up underneath it, some of which are still flourishing. This plant faces north and is growing in a very sheltered border surrounded by Yew hedges. The seeds come in little alternate bunches of about a dozen each, and are like small Ivy-berries but more oval in shape and arranged in loose racemes rather than the dense rounded clusters seen in Hedera. Upon seeing the specimens sent by Mr. Hamilton, the authorities at Kew confirmed that gentleman's opinion as to the relative sexes of the two plants, and reported never to have seen the species in fruit before. The branches sent were perfectly distinct in appearance, the male plant (obtained at Coombe Wood) bearing small oval leaves of dark green, with erectly-branching habit; the female much larger and broader leaves of brighter yellow-green, upon yellow stems of a more diffuse habit. It would therefore seem that to secure seed from these shrubs it is necessary, as in so many other instances, to grow the male and female plants side by side in the same garden. In such cases, even when the flowers seem just the same, it often happens that functionally the plants belong to one sex only, and for their fertility require the presence of a second individual, in which the functions of the opposite sex are active.

BUDDLEIA.

These flowering shrubs, including about 100 known kinds, commemorate an old English botanist—Adam Buddle—at one time vicar of Farnbridge, Essex. The family is well-marked and includes many beautiful things, natives of the warmer parts of both hemispheres, in the new world from California to Chili, and in the old world throughout Africa, and in Asia from Afghanistan to Japan and the Malay Archipelago. Coming mainly from tropical and sub-tropical regions, many kinds (if introduced) would need stove or greenhouse culture in this country.

There are now in cultivation 14 species, 7 varieties, and 1 supposed hybrid. Of these, 4 species will not thrive in the open air in Britain, and several others only do well in favoured places of the south-west. In the warmer parts of the United Kingdom *B. globosa* is hardy, while in colder parts it is tender. *B. Colvilei* is yet less hardy, resisting only in the more favoured parts of England and Ireland. *Buddleia variabilis* and its forms appear to be the hardiest of the group, and though they have not yet been fully tested, there is reason to believe that they will prove hardy throughout the greater part of Britain. With the exception of *lindleyana*, *pulchella*, and *japonica* and its varieties, all the species are strong growers, and if not pruned become ungainly. Such kinds as *variabilis* and its forms, *albiflora*, and *nivea*, should be cut back to the main stems in early spring, before growth commences. *B. globosa* needs moderate pruning, while *Colvilei* has proved so uncertain in gardens generally that it is often left to grow and flower in its own way.

All the kinds are of easy culture and grow in almost any soil ; planted in fertile loam and a sunny position, with plenty of water at the roots, they grow rapidly. They also do well on sheltered walls, indeed (save in quite the warmest parts) *lindleyana* will only succeed out of doors in this way. In view of their strong growth they should always have plenty of room. To gain their full effect *B. variabilis* and its forms should be grouped in good soil, and pruned well back in early spring ; they will then make growths of 8 to 10 feet in a season, arching gracefully under their spike-like clusters 18 to 30 inches long and continued from mid-July into September. Their increase is simple either by seeds or cuttings : seedlings raised in gentle heat will flower in their second season. Cuttings of half-ripe wood, put in sandy soil under glass in a cold frame or cool greenhouse in September, will root in about six weeks, and make flowering plants for the following year. Fully ripe wood of the current season's growth, inserted in the open ground during November and December, root more slowly, taking till the following autumn before they are fit to transplant.



Buddleia Globosa on a Warm House-Front.

Buddleias are mainly mid-season shrubs, at their best in July and August, and for this reason valuable ; most of them retain their leaves until late in winter. All have handsome foliage, and two kinds, *paniculata* and *nivea*, are well worth growing for this alone, their leaves and stems being covered with a dense white tomentum. In *B. globosa* the flowers appear as small globular heads, but in the other species they are in small flat clusters, further collected into long tails or erect spikes which appear singly or in panicles at the tips of the shoots. In *globosa* and *brasiliensis* they are yellow, in *madagascariensis* orange, in *asiatica* white, in *albiflora* lilac, and the others in varying shades of purple. Rich in honey, the flowers are much sought by bees, and so much is this the case with *variabilis* that bee-keepers would do well to grow it. Those not so interested however should try to keep these insects at a distance, for the flowers last double the usual time when untouched by bees.

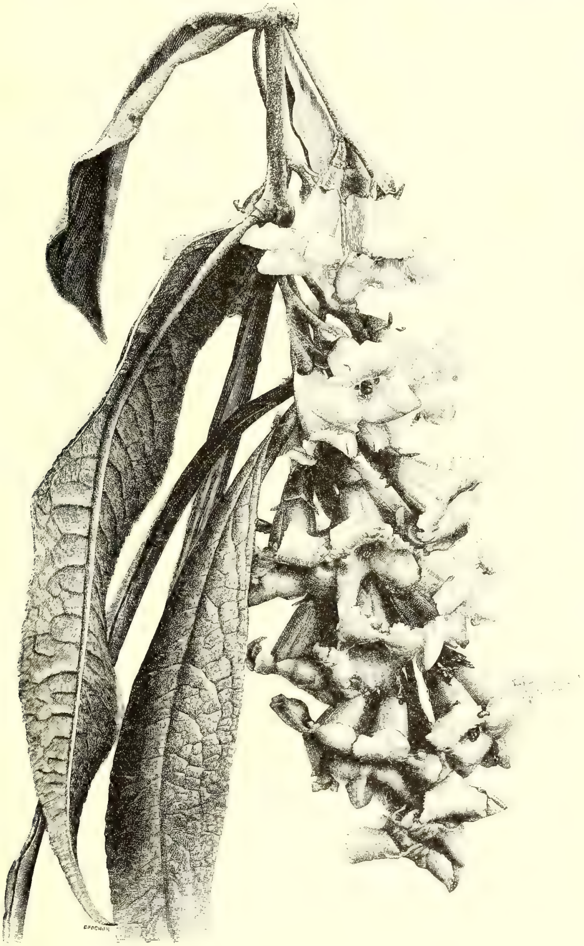
Buddleia albiflora.—This plant has been misnamed, for the flowers are lilac and not white. It bears a general resemblance to *B. variabilis* but is inferior to its better forms; hence, although hardy, it will be more valued by collectors than the ordinary gardener. A plant of fine growth, erect and spreading, it will make shoots 6 to 8 feet long in a season. The stems are dark-coloured near their tips, with tapering lance-shaped leaves, dark-green above and silvery-grey beneath from their dense coating of hairs. Flowers small and fragrant, lilac-coloured with an orange throat which is closed by the stamens and a ring of hairs. These flowers are densely crowded into spike-like clusters measuring as much as 18 to 24 inches long. Even the side-shoots carry lesser panicles of flower, so that, from the last week in July into September, the plant is a mass of bloom. It is fairly common on the shrub-clad mountains of Central China, at from 3,000 to 6,000 feet, and was sent to Messrs. Veitch by the writer in 1900, blooming in their nurseries two years later. A form with serrate leaves has been named *albiflora* var. *serrulata* by Hemsley.

B. asiatica.—It seems strange that this neat and pretty plant, so common in the gardens of the far East, should be almost unknown with us. It flowers in winter, and cuttings struck in spring, potted on and grown outside in the sunniest place possible, should make good plants in 8-inch pots by the autumn. They should then be stood in a light greenhouse with genial warmth and abundant feeding. Such is its treatment in the far East, where it is a beautiful sight throughout January and February, and I see no reason why it should not succeed in this country. In our most favoured gardens it might even thrive out of doors on a warm wall. The flowers are white, very fragrant, and arranged in narrow racemes clustered into panicles at the ends of the branches. Leaves narrowly tapering, toothed at the edges, and otherwise like those of *albiflora;* stems round and covered with a white felt while young. The plant is found throughout eastern Asia, and in Java. In China it is fairly common in the Yangtsze Valley, Yunnan, and South China generally. It is not in the Kew Hand-list, and was probably lost prior to its re-introduction by the writer in 1902.

B. auriculata.—A tender species from South Africa, sometimes seen under glass as a straggling shrub. The flowers, borne at the tips of the shoots, are violet-scented and cream or pale lilac in colour with an orange throat. Leaves broadly lance-shaped and covered with greyish white hairs on the underside. It flowered in this country for the first time in the garden of Sir Geo. Macleay in 1881.

B. brasiliensis.—An American shrub, flowered many years ago in a stove at the Edinburgh Botanic Gardens, having come from Russia. Since no mention of it is made in the Kew list, it has probably disappeared, but judging from dried material the loss is not great. The plant is of coarse growth, with oblong leaves becoming angular when mature, carried upon winged stalks. Flowers small and dull yellow, crowded into erect spikes. Mexico, south to Brazil.

B. Colvilei.—The most beautiful plant of the group, unfortunately is tender and shy of flower in this country. Anyone who has seen its exquisite clusters can well believe Sir Joseph Hooker, that "a bush or small tree 30 feet high and as far through, when covered with pendulous masses of rose-purple or crimson flowers relieved by the dark green foliage, presents a sight that it is difficult to exaggerate." So far however it has only prospered here and there in this country. The first to flower it in Europe was Mr. Gumbleton of Belgrove, Cork; it has since bloomed in other gardens, but nowhere freely. A plant in the Himalayan house at Kew is now some 25 to 30 feet high, with a trunk as thick as a man's thigh. This plant flowered for the first time in 1900, and has since flowered annually, though never very freely. The leaves and flowers are finely shown in the engraving, the former being 6 to 10 inches long, dark green above, grey beneath, hairy on both sides. The strong shoots are at first winged and square, becoming rounded later; the weaker side-shoots are round from the first. The flowers are rose-purple of varying intensity, shading to pale pink in the mouth and throat. Sir Joseph Hooker, who was the first to discover this plant in 1849, found it on the margins of forests on the Sikkim Himalaya, at from 10,000 to 12,000 feet. Coming from such an elevation one would have expected it to prove hardier than is the case. The flowers shown life-size in our engraving were from a tree in the collection of Mr Chambers at Haslemere.



Buddleia Colvilei.
(*Engraved for "Flora," from a photograph at Gray's Wood Hill, Haslemere.*)

B. globosa.—The best known kind and one of the most distinct of shrubs. It is hardy from the midlands southwards save in bleak situations, though it often suffers in severe winters. Of strong growth, it easily attains a height of 12 to 15 feet in the open, and more than this against a house-front such as that of our engraving, and in parts of the south-west where severe frost is unknown. The stems are angular and winged while young, becoming round later. Leaves shortly stalked, 6 to 12 inches long, lance-shaped, dark-green and much wrinkled above, with the under sides and young growths covered with a pale-grey woolly felt. The venation of the leaves is very beautiful. Flowers yellow, arranged as small globular heads at the ends of the shoots, in a way that distinguishes this from all other kinds in cultivation. It is a native of Chili and Peru.

B. hemsleyana.—This plant is described by Koehne in *Gartenflora* (1903, p. 169), from material received from St. Petersburg. He classes it near *B. variabilis*, but distinct from that kind in its smaller flowers, absence of the orange colour in the throat, darker green leaves, and more erect habit. The shrub is now in cultivation at Kew, and in the collection of Mr. Chambers at Haslemere, and both plants flowered during the past summer. In habit and foliage it comes nearer to *B. albiflora* than to *variabilis*, the details which distinguish it from the first-named being only such as to appeal to botanists. For my own part I regard it as a poor form of *albiflora*, and the most weedy member of the family. It occurs in the Min Valley of Western China, growing among mountain shrubs at elevations of 3,000 to 4,500 feet.

B. japonica.—This hardy Japanese kind was formerly grown in France as *B. curviflora*, but when dealing with the Chinese Buddleias for the *Index Floræ Sinensis*, Hemsley found that it was very different from the true *B. curvi-*

flora of Hooker and Arnott, and therefore renamed it. The true *B. curviflora*—of which the only specimen is in the Kew herbarium—was collected in the Loo-Choo Islands by Captain Beechey in 1827, and has flower-clusters very like some of the forms of *B. variabilis*. It differs also in other important points from the plant once confused with it.

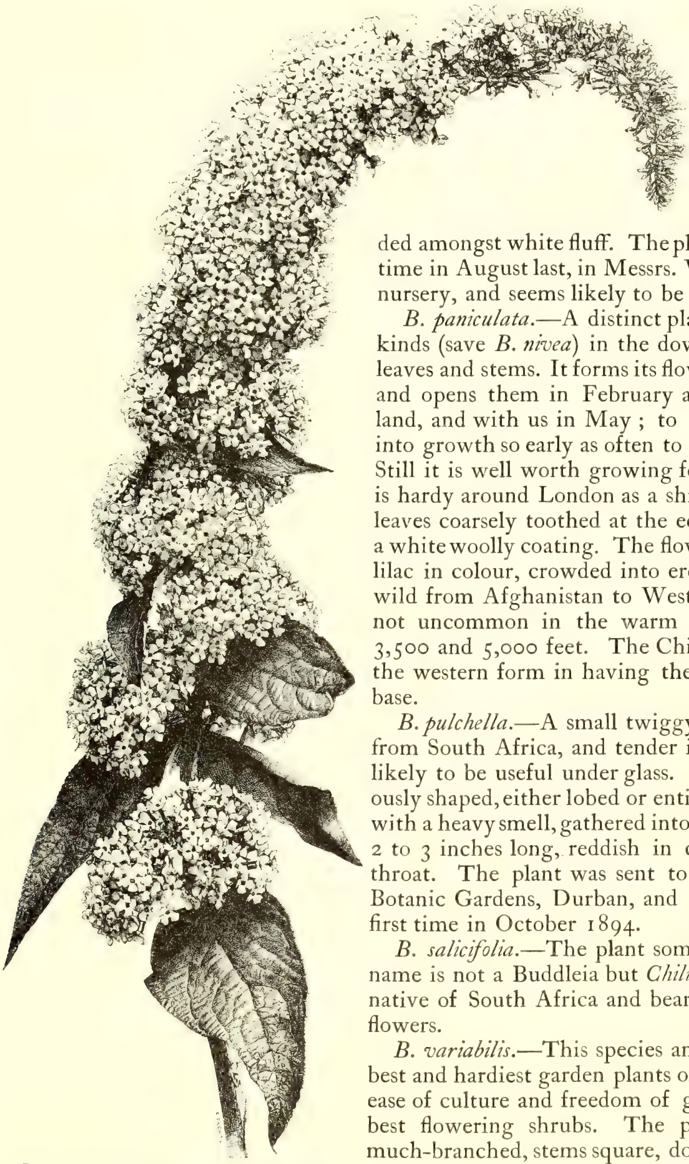
B. japonica is a sparingly branched shrub of 4 to 6 feet, with square and much winged stems, green while young, becoming brown with age. Leaves very shortly stalked, 4 to 8 inches long, smooth and dark green above, paler, much veined, and slightly hairy on the under side. The flowers are clustered in a terminal spike 6 to 8 inches long, which is usually attended by two smaller side-spikes. The flowers are about $\frac{1}{2}$ inch long in the tube, with narrow pale-lilac lobes, and hang on until finally split by the seed-vessels, which set with great regularity. The presence of these pendulous tails of heavy fruits in September, distinguishes this species from all others in cultivation. Seedlings vary much and in France several well-marked varieties have been raised: *carnea*, differing from the parent in the colour of its flowers, which are flesh pink; *insignis*, a compact form of erect growth, in appearance quite unlike the parent and well worth growing for its flowers of brighter colour; and *salicifolia*, with narrower leaves and a more slender much-branched flower-spike.

B. intermedia.—Under this name Carrière gives a coloured figure in the *Rev. Hort.*, 1873, p. 150, of a plant which appeared among a batch of *B. japonica* seedlings in 1871. Its features are discussed and the conclusion reached that it is a chance hybrid between *japonica* and *lindleyana*. As shown, the flowers and their arrangement suggest *lindleyana*, whilst the foliage favours *japonica*. I do not know if it ever reached this country, but such plants as I have seen cultivated as *intermedia* are *japonica* pure and simple. In view of the fact that, apart from Carrière's supposed cross no hybrid Buddleia has been raised, and that seedling forms of *japonica* differ so widely, one is I think justified in concluding that the "hybrid" is but a seedling form of *B. japonica*.

B. lindleyana.—A weak-growing species, arched and spreading, with angular much-winged branches, somewhat hairy while young and seldom of great height save in Devonshire, where it grows 12 to 15 feet against sheltered walls. Leaves short, dark-green above and paler below; margins mostly entire; a variety collected at Ichang by Henry has deeply toothed edges. The flowers are in clusters of three arranged in a pendent raceme, varying from 2 inches to nearly a foot in length. They are small, about $\frac{3}{4}$ inch long, violet-purple in colour, with a curved tube covered on the outside with fine grey hairs. A native of the warmer parts of China, it is common in the Yangtsze Valley on banks and cliffs in dry sunny places, extending thence to the far west but never ascending above 2,500 feet. It is tender in this country, and while pretty and distinct it is rarely met with. In the more favoured gardens of the south and west it will live out of doors, but is happiest on a warm wall even in these. The flowers are a little disappointing, losing their colour quickly and, in a long raceme, withering away before the upper buds have time to expand.

B. madagascariensis.—This old plant is sometimes met with in greenhouses but it needs much room and is seldom very satisfactory, though the large clusters shown at Westminster early in the present year prove that it can be flowered very finely in this country. Leaves clothed with white woolly hairs, much wrinkled above, cottony white or inclined to be rusty below. The flowers are orange-coloured and fragrant, in compound racemes, of 6 to 10 inches, the corolla funnel-shaped and covered with cottony hairs on the outside. A native of Madagascar, it is also widely spread throughout the adjacent islands, and even occurs in St. Helena. Though a little tender even in the South of France, it is often used to trail downwards over the face of a sunny wall, and its effect when in full flower is charming.

B. nivea.—A new and distinct kind found by the writer in shrubberies and wooded places of western China, at elevations of 7,000 to 8,000 feet. The stems and underside of the leaves are enveloped by a dense coating of fluffy white hairs, and to this the plant owes its beauty and its name, the flowers being small and not showy. The plant forms a much-branched bush 6 to 8 feet high, of erect and spreading habit, with stems somewhat angular. Leaves very shortly stalked, 6 to 9 inches long, broadly tapering, dark-green above and nearly smooth at maturity. Flowers clustered and arranged in slender tails of 6 to 12 inches, the single blooms being small, lavender-coloured, and imbedded amongst white fluff. The plant flowered for the first time in August last, in Messrs. Veitch's Coombe Wood nursery, and seems likely to be hardy.



Buddleia Variabilis Var. Magnifica.
(*Engraved for "Flora," from a plant in Veitch's Nursery, Coombe Wood.*)

B. paniculata.—A distinct plant differing from other kinds (save *B. nivea*) in the downy white surface of its leaves and stems. It forms its flower-buds in the autumn and opens them in February and March in its own land, and with us in May; to do this it has to start into growth so early as often to be cut by spring frosts. Still it is well worth growing for its foliage alone and is hardy around London as a shrub of 6 to 8 feet, with leaves coarsely toothed at the edges, and covered with a white woolly coating. The flowers are fragrant, bright lilac in colour, crowded into erect spikes. It is found wild from Afghanistan to Western China, where it is not uncommon in the warm river valleys between 3,500 and 5,000 feet. The Chinese plant differs from the western form in having the leaves united at their base.

B. pulchella.—A small twiggy shrub of neat growth from South Africa, and tender in this country though likely to be useful under glass. Leaves green and variously shaped, either lobed or entire. Flowers small and with a heavy smell, gathered into small terminal clusters, 2 to 3 inches long, reddish in colour with an orange throat. The plant was sent to Kew from the Natal Botanic Gardens, Durban, and flowered there for the first time in October 1894.

B. salicifolia.—The plant sometimes seen under this name is not a Buddleia but *Chilianthus oleaceus.* It is a native of South Africa and bears flat clusters of white flowers.

B. variabilis.—This species and its forms supply the best and hardiest garden plants of the group, which for ease of culture and freedom of growth are among our best flowering shrubs. The plant is vigorous and much-branched, stems square, downy, and with a wing at each angle while young, attaining a length of 8 to 12 feet in one season. Leaves shortly stalked, 3 to 12 inches in length and almost as variable in shape, dark-green above and silvery grey beneath. The flowers are in flattish clusters arranged as rounded tails 6 to 30 inches in length and depending freely from every shoot. Their colour varies from lilac to bright violet-purple, and in the better forms the mouth and throat of each flower is bright orange. The individual flowers are small but what they lack in size is made up by their number, and a well-grown plant of this species, with its pleasing fragrance, is a charming addition to any garden. It is common in Central and Western China, occurring as high as 9,000 feet, but this is in sheltered river valleys which enjoy a warmer climate than is usual at such an elevation. Though first found by Dr. Henry near Ichang in Central China, it came into cultivation at St. Petersburg, passing thence to the *Jardin des Plantes*, and from there to Kew where it flowered in 1897. This early form is very poor, of straggling and semi-prostrate habit, and clusters washy in colour and thin; it is however the first to flower.

In 1893 M. Vilmorin received from the late Père Soulie, seeds of a Buddleia which flowered in the following year and proved to be a much better form of *variabilis*. In habit this was more erect, with denser spikes and finer colour, and from the description given in Vilmorin's *Fruticetum* it would seem to be identical with the plant known in this country as var. *veitchiana*. While travelling for Messrs. Veitch in Central China I constantly met with this Buddleia and its variability was remarkable, with the result that the following fine forms have been introduced: Variety *typica*, the commonest form in Hupeh, of erect and robust habit, with rather lax tails of lilac-purple flowers in which the orange of the eye and throat is but slightly developed. It flowers in the latter half of August, and is much superior to the first-known form, which it will in time replace; *magnifica* is a very distinct plant, having larger bright violet-purple flowers, with deep orange eye and the margins of the petals reflexed. In habit it resembles the above but blooms a week earlier. Those who saw it at the Royal Horticultural Society's Hall in August last, will not readily forget this noble plant. Variety *veitchiana* is again distinct in many ways. Its habit, at first erect, becomes gracefully arched as the flowering time approaches. The clusters are more dense and their colour several shades darker and with a bright orange centre to the individual flowers. It is the earliest of the Hupeh forms to flower, being quite three weeks earlier than var. *typica*. A fourth form *Wilsoni*, with flower-clusters 30 inches long, and differing markedly in other ways from other forms. Its habit is quite distinct, with stems tall and arching, the inter-nodes very long, and the leaves longer and more tapering. The flowers are half as large again as in var. *typica*, of a bright rose-lilac colour with intense orange eye. The corolla-lobes are not flat and spreading, but half erect, crinkled, and the margins reflexed. The clusters are drooping, longer than in any other form, and the latest of all to open, being at their best throughout September. The four forms here described are all wild forms of one type and not varieties of one another, and still less mere garden selections. They were raised from different packets of seed, and are quite distinct one from another. E. H. WILSON.

THE ALOES.

THOSE who have seen the Riviera in early spring, and know the famous garden at La Mortola, will remember with pleasure the brilliant Aloes then in flower. No one can mistake them, for so vivid are their long spikes, rising from large rosettes of greyish leaves, that no other plants even at this time of the year can rival them. They enjoy the bright sunshine of our southern summer and are content with little water, their stems and thick fleshy leaves serving as stores of moisture, and when other plants wither they look fresh and happy. Such sun-lovers are not designed to thrive in the dim light of a glasshouse under a cloudy sky, nor can they display their true beauty under such conditions. Still, those who own gardens on the Mediterranean, or even on the southern shores of Britain, can easily grow several species, and the many tender kinds may be used effectively for summer gardening.

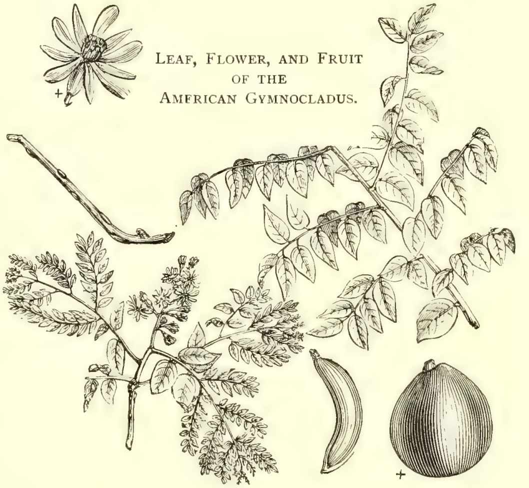
The Aloes form an African genus akin to our northern *Asphodelus*, and about 150 species are known. Most of them are from dry mountain slopes and stony, barren regions, extending from the Cape along the mountain-chains of East Africa, as far as Upper Egypt and southern Arabia. On the west side of Africa Aloes have also been found from Namaqua and Damaraland as far as Togoland in the Niger region, and with fuller knowledge of Central Africa we shall certainly obtain many others. It is hardly to be expected that the tropical species will thrive in the open so far north, but only a few of these tender plants have yet been introduced, those cultivated being mainly the hardier kinds from South Africa. Many of these are from a considerable elevation and hardier than is often supposed, since a few degrees of frost will not hurt them if dry at the time, and provided the inclement weather does not last too long. Kinds from the Transvaal, Abyssinia, and Arabia, are noticeably less hardy, while the tropical plants suffer occasionally at La Mortola if the thermometer remains too long near the freezing point, though it may be only in the loss of flower. About one-half of all the Aloes known are grown here, and it is not an easy task to decide which are the best for general cultivation, since all have charms of their own. A number of low-growing species cover the ground in large patches, yielding effects as fine as others which grow into large bushes or small trees. Several kinds have leaves life a Kniphofia, as for instance *Aloe Cooperi*. These however can hardly be considered more than curiosities, and on account of their thinner leaves are more sensitive to drought. In their native haunts they grow with grasses in deep, fresh soil. They are rare in gardens, few kinds ever having been introduced. Others again bear short, thick leaves which are truly succulent, such as *Aloes brevifolia*, *depressa*, *pratensis*, *virens*, and *humilis*—all frequently met with —giving many unbranched spikes of bright red flowers. *Aloe aristata* is a little gem, with rosettes of 50 to 100 small leaves, each ending in a long drawn-out point and covered thickly on the margins and on the back with white tubercles. It is wonderful how this little plant resists the intense drought at La Mortola, rolling up its leaves into a small ball wrapped in the outer ones, which become so faded and scorched as to seem lifeless. But with the first autumn rain (late in September or early in October), the little rosettes expand and look as fresh as ever :—there are few more striking instances of plant-resurrection. *Aloe variegata* is another of the stemless species and one not often met with. It is a real curiosity, its triangular leaves being arranged one above the other in three distinct lines, their surface hard and leathery, and copiously spotted with white bands. It is less useful for the open air, water often resting in the heart and causing death.

A further group contains a great number of fair-sized but stemless Aloes, often with leaves curiously lined and spotted. They form the class to which the name of *saponariæ* has been given, *Aloe saponaria* being the best-known of them. This plant varies so much that one might gather many forms so different that anyone might take them for distinct species. If grown on barren soil, or in rocky places with little moisture, the leaves are hard and tough, remaining short and brown, with their edges rolled inwards ; under better conditions the leaves are longer and less rolled in, whilst in shady places they become long, flat, and pale green with darker lines. *Aloe saponaria* produces a vast quantity of suckers spreading into large patches, and is so easily propagated as to be common in gardens. *Aloe latifolia* is a mere form of this species, with larger leaves and flowers. But the finest of this group is certainly the old *Aloe striata*, perhaps best known in gardens as *Aloe Hanburyana*—so called by M. Naudin in honour of the late Daniel Hanbury, the famous British pharmacologist. Its coral-red flowers come out in clusters, grouped together as a large spreading head borne on a stout, erect stem. The leaves are spineless, with only a broad, horny border around the edges, often of a fine reddish tint. Between this and other Aloes, there are many hybrids in which the leaves bear prickly margins, but none are so pretty as the real plant. The group *saponariæ* comprises about 25 species, all well worth cultivation. *Aloe Baumii*, a very fine plant of this group, has lately been figured in the *Botanical Magazine* (t. 7948) ; it has beautifully spotted leaves.

Among the larger-growing kinds are many in which the leaves are finely marked. A good example is the old *Aloe abyssinica*, now more often met with, since its reintroduction by the famous traveller Schweinfurth. It occurs in many varieties, in some of which the leaves are wholly green. Before passing to the tree-like Aloes let us mention those with thin and delicate stems, such as *Aloe mitriformis* and its many varieties, with stems several yards long trailing over rocks and walls, and long aerial roots just like some of the Aroides. The flowers show at the tips of the stems on long peduncles, and are so closely grouped and drooping as to form a kind of mitre. In some of the varieties this mitre is not formed, the racemes being longer and fuller. More graceful than *mitriformis* is *Aloe ciliaris* from eastern Cape Colony. Its stems may be as stout as the finger or no thicker than a pencil, with thin, remote, and finely-toothed leaves, and indeed unlike an Aloe until it flowers. It may be seen creeping among shrubs and is useful to cover old walls and bare corners, growing as freely in the shade as in the sun, but with a preference for fresh soil on account of its thinner leaves. From the beginning of December to nearly June it is constantly in beauty, and in mid-winter is one mass of short erect spikes of coral-red.

Among taller Aloes which, when old, make large bushes or little trees, *Aloe arborescens* is most commonly met with. It is a fine plant, found half-wild in several places near Monaco and Nice. Its native country is uncertain, all we know is that it came "from the Cape," and certainly from a high elevation, since it resists the severest winters in the south. There exist two forms, one (the type) with tall stems, large leaves of very glaucous colour, and flowers appearing early as long spikes of brilliant red. The second variety makes rounded bushes, with shorter leaves of deeper green in which the marginal teeth are set more closely, and shorter flower-spikes, coming later, and of a different shade of red. This is a fine plant for grouping. *Aloe Salm-Dyckiana* is like a larger *A. arborescens*, but much taller and in every way more vigorous. Its flowers also are different, the stamens standing out far beyond the tube of the flowers, these being folded in long spikes of 2 to 3 feet and of the most vivid scarlet. This is one of the finest of the genus and should be widely grown. It was introduced long ago but its native place has never been properly known. Similar plants, but with very glaucous leaves, are *Aloe caesia* and *Aloe speciosa*. Both have white flowers with green tips and fine green stripes; the first has the stamens hardly showing while the bright red stamens of the second are boldly thrust far out of the flowers. When old they form large rounded bushes and are well worth growing. *Aloe caesia* is common on the Riviera under many names, such as *Aloe africana* and *Aloe soccotrina*—both of which belong to very different plants. *Aloe speciosa* is of later introduction and is still rare. *Aloe ferox* flowers in spring and is very handsome, forming robust trunks with a large crown of thick, glaucous and very prickly leaves. The flower-head is branched like a candelabrum and varies in colour from a bright yellow to intense red. The flowers are densely grouped and have the stamens widely exserted. There are many forms of this fine plant. The true species has shorter ovate-lanceolate leaves, thickly covered on both sides with brown prickles; others have the prickles only below (*A. supralaevis*), and others are quite smooth except along the margins (*A. supralaevis* var. *Hanburyi*). This plant differs so markedly from other Aloes that it has been made a sub-genus under the name *Pachydendron*. It is from eastern South Africa as far as the Lebombo mountains, where it covers large tracts of land.

La Mortola. ALWIN BERGER.


Leaf, Flower, and Fruit of the American Gymnocladus.

Errata.—We regret that owing to some confusion in the reference numbers, a different engraving from that intended was used in our article upon the Gymnocladus on page 313. The sprays there shown are *Gleditschia triacanthos*, an allied tree but quite unlike the Gymnocladus, as will be seen upon comparison with the engraving now given.

NEW BULBOUS IRISES—I. WARLEYENSIS, AND I. BUCHARICA.*

MR. Moon's coloured drawing gives a good idea of these new plants—that with purple flowers *I. warleyensis*, the other *I. bucharica*. Both were found on the banks of the Sureh-ab, a tributary of the Amu Darya, in the region of Bokhara, and at an elevation of 5,000 to 6,000 feet. They belong to the *Juno* group of bulbous Irises, though distinguished from other bulbous kinds by having small, spreading, and sometimes reflexed standards, of the character shown by *I. warleyensis* in the plate, which has one such projecting horizontally below the falls on either side of the flower. The *Juno* Irises are either tall—with a stem from 1 to 2 feet high, dwarf—measuring 3 to 6 inches, or even stemless to all appearance, no stalk showing above ground. These two kinds belong to the tall group, of which they are the only ones bearing falls with wingless claws which expand suddenly into a deflexed blade. They are closely allied to one another and also to *I. orchioides* (a plant from the same region), but they differ from it in having leaves with a horny margin, unknown in that species save in the variety *coerulea*, which comes very near *I. warleyensis*.

CULTURE.—In a broad sense these may be classed as varieties of *Iris orchioides*, a plant I have had no difficulty in growing in an ordinary bed, or better in a narrow border at the foot of a south wall. These new species I should plant in some such position, and when at rest cover them with a glass-light to ward off rain. Any good, well-drained soil is suitable, especially if containing some grit and a little lime. *I. warleyensis* I have seen with Sir Michael Foster in an open bed, protected by surrounding shrubs.

I. warleyensis.—To the falls are due the great beauty of this flower; they have a pale-violet strap-shaped claw with wavy edges, which broadens suddenly into a nearly round blade of rich purple with a white margin and a bright orange crest, surrounded by a zone of the same colour. In this there is however some variation, the white and the orange being sometimes inconspicuous or absent. The violet standards are less showy and somewhat variable in shape, but always pointed, with an expansion just beneath. The style-arms are violet on the upper surface, paler below; the crests long and of the same colour, with waved and toothed margins.

I. bucharica.—A beautiful plant coming very near *I. orchioides*, but smaller, shorter, and more slender, with stems 12 to 18 inches high, and 6 or 7 leaves which are shorter, less gradually tapering, and more distinctly striated on the under surface. The flowers also are sessile or nearly so, instead of being stalked as in *orchioides*. The falls have a pure-white strap-shaped claw, and a rich golden blade with a long crest occupying the hinder two-thirds, and reaching down the claw as an inconspicuous ridge. Spreading from the crest or parallel with it are sometimes a few dark purple marks, but this feature is variable. The standards are pure white, the claw channelled, expanding into a flat blade.

Cambridge. R. IRWIN LYNCH.

THE ROSEMARY (*Rosmarinus*).

THE Rosemary forms part of the great family of lipped-flowers (*Labiatæ*), and derives its Latin name from two words which may be freely translated "sea-spray." The Greeks called it Libanotis from *libanos*—incense: Pliny in book 24, chap. 11, says "The Rosemary breathes of incense." Gaspard Bauhin in his "Pinax" recalls many names under which the plant was known to early botanists:—*Rosmarinus hortensis*, *Rosmarinum coronarium*, *Cneorum*, *Libanotis coronaria*, *Casia nigra*, *Hyssopus*, and *Hebræorum*. Its present name of *Rosmarinus officinalis* was given by Linnæus.

Many of the primitive Linnean types cover a vast area and exhibit local races or variations of which the interest and garden value is little understood. The Rosemary is no exception to this rule. In Europe it covers Southern France, Spain and Portugal, Italy, Dalmatia, Greece, Turkey, and many of the adjacent islands. In France it loves the rocky hill-sides

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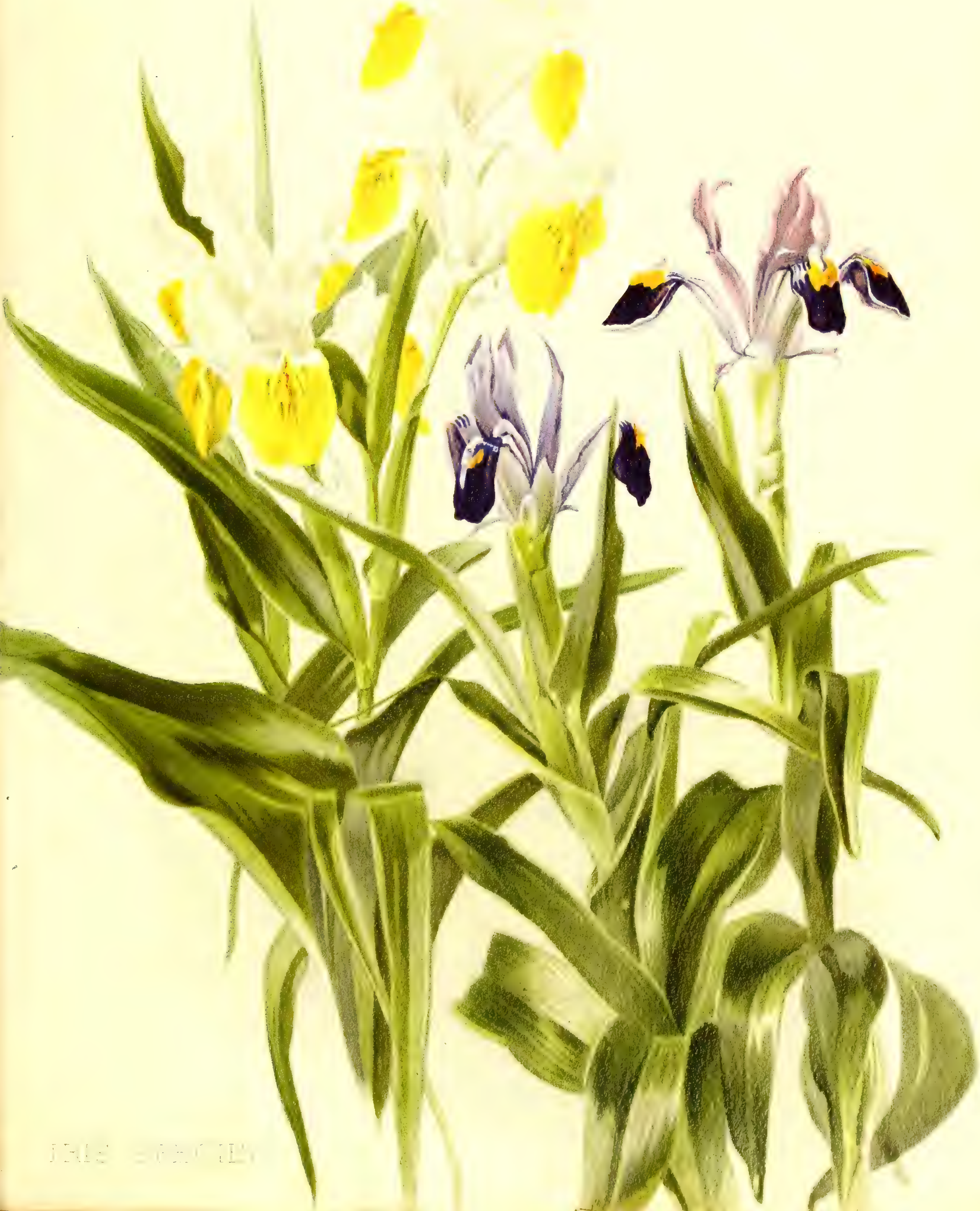
* With a coloured plate from a drawing by the late H. G. Moon.



IRIS [illegible]

of Provence and the Maritime Alps, around Grasse, Fréjus, Toulon, and Marseilles; thence, in the valley of the Rhône, it is found at Villeneuve near Avignon, and at Orange, Montélimar, Tournon, and Romans. Nor is it confined to the Rhône Valley but spreads over parts of Languedoc, Rousillon, the Pyrénées Orientales and Centrales, and other regions. The botanist Jordan gathered living specimens, both wild and cultivated, from every part of the Mediterranean region, and his collection, comprising 150 pot-plants and an equal number grown in the open, contained about a dozen distinct forms. Drawings of these were made and perhaps still exist, but I think nothing was published concerning them. Studies of this kind are full of interest and present little difficulty beyond securing correspondents in as many parts as possible of the area covered by the plant, and the collection with their help of the seeds and cuttings desired. The wider the area covered, the greater is the certainty of gathering distinct forms.

In following such a study it will be found that many tender southern plants push little colonies towards the north, where, in sheltered places they endure a lower temperature than is common to their kind. Compared with others in a garden such plants often show a greater degree of hardiness, and this proved to be so among these forms of Rosemary. The nature of the soil also exerts a marked influence upon the hardiness of the Rosemary, which, in sunny places and in poor dry soil mixed with stones, will endure cold much better than when in soils that are deep and rich. With due attention to this important fact, the plants found by Jordan to be the most hardy in a sharp winter, were sturdy little plants with fair-sized flowers of pale lilac, coming from Nyons (Drôme), Tournon (Ardèche), and a purchased garden form. These have since passed into cultivation as *Rosmarinus off. rigidus*. The plants from Corsica were fine in growth and colour, but proved the most tender of the collection. A plant from Bône in Algeria, remarkable for the length of its flower-spikes, was named *longe-racemosus*, and two others received from Hyères as *major* and *diffusus*, were distinguished by their erect and decumbent habits of growth. Three forms gathered at La Fontaine-de-Vaucluse differed widely, two of them in habit, as indicated by the names *erectus* and *subdiffusus*, and the third, *longifolius*, by its longer leaves. In addition to these there were other variations more difficult to put in words, arising from the number and size of the flowers, their shape, and colour. Several colour forms were very distinct, one from De Mormoiron in Vaucluse being a beautiful pure white, while from St. Tropez (Var) came a pale flower with only a trace of blue, and from Porto Vecchio (Corsica) forms of a rich deep blue very different from the pale shade of violet seen on the mainland. The flowers being readily fertilised by bees, seedlings failed to convey the distinctive features of the parents, and it was necessary to increase them by cuttings.

In old writings the Rosemary is known as the "Herbe aux couronnes" from its use, interwoven with Bay and Myrtle, in the festal crowns of the period. Later its virtues were sung by the troubadours of the days of chivalry. In some countries it was the custom to place a spray of Rosemary in the hands of bodies awaiting burial, and also to plant it upon the grave, as is recalled in the old Chanson de Malbrough:

> A l'entour de sa tombe
> Romarin l'on planta.
> Sur la plus haute branche
> Le rossignol chanta.

"To give Rosemary" (*donner du Romarin*) is a popular French idiom signifying refusal, and in matters matrimonial a refusal of marriage, a meaning apparently due to some ancient custom by which a rejected suitor was dismissed by the gift of a bunch of Rosemary. An old writer has left on record that "Rosemary preserves from infection any house in which it is freely burned," and it is still held in high esteem by herbalists. Suspended over the doorway it was supposed to bring luck and to preserve from robbery, whilst it was claimed that 6 lbs. of the precious herb, pounded in a mortar and then added to the bath, would restore youth and beauty to aged persons who bathed therein thrice daily. In parts of southern Europe it is still worn in the hair by young girls on their wedding day, and is used in sprinkling holy water on the coffin at funerals.

Bees are fond of the Rosemary and where

it abounds their honey gains in excellence. To this is ascribed the virtue of the honey of Mt. Himette and Mt. Ida in classic times, and that of Narbonne and Mahon at the present day. VIVIAND MOREL.

Lyon.

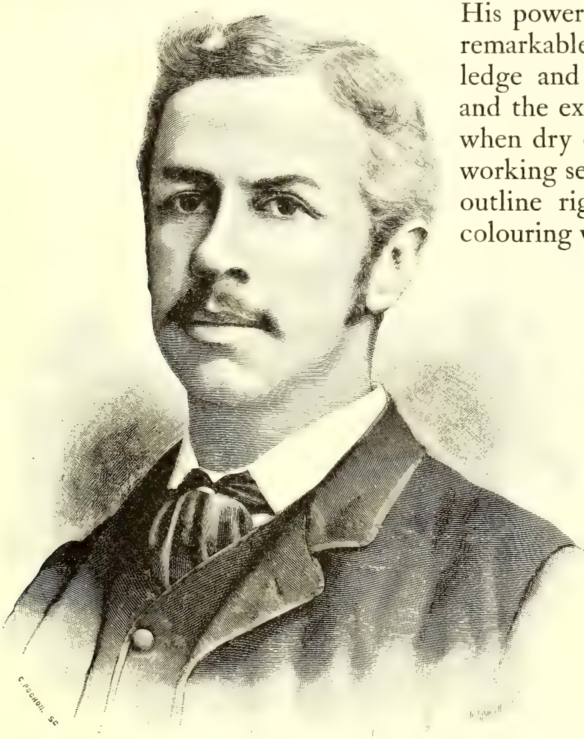
HENRY G. MOON.

With infinite regret we have to give some record of the life of the artist of Flora and Sylva, who died at St. Albans on 6th October. Best of flower painters and a landscape painter of fine accomplishment and finer promise, his loss is keenly felt by all who knew him. For many years he made the drawings for the coloured plates of the *Garden*, and also the plates for that noble book on Orchids issued by Mr. Sander. For a long period all the finest new plants were drawn by him with perfect truth to nature, in form as in colour.

Born 10th February 1857, he went to school at Dr. Bell's at Barnett, until the death of his father; he was also a student at the Birkbeck and St. Martin's School of Art, where he gained many prizes. He was the son of a parliamentary agent, who, dying early in life, left a young and numerous family unprovided for, and Henry, brought up in comfort, in a garden where Alexandra Palace now stands, had soon to go to work as a boy in a solicitor's office and in the most inartistic surroundings. An artist to the finger-tips however, he began to sketch on Hampstead Heath in the summer mornings and evenings, and there were some early studies in the London schools. About that time I put an advertisement seeking one to draw flowers after nature, and a tall, rather dark youth came to see me, looking more like a Celt than a Londoner. I gave him a spray of white Azalea to draw upon wood, which he brought back very gracefully done. This led to his giving up the solicitor's office and coming to the *Garden*, which brought him nearer to beautiful things in the plant way, and also to gardens and country seats.

Before the days of the *Garden* plates it was a common practice to exaggerate the drawing of flowers. There was a false florists' ideal set up to which all had to conform: a circle and a large Cauliflower being the accepted models. This way was bad for all, and for none more so than the unfortunate artists who had not to think of what they saw, so much as of the corrupt ideal they were told to strive for. So we began with the determination to draw things as they drew themselves, and never deviated from it—no matter who was displeased. If the flowers of a plant were small, from the weakness of newly-introduced or feeble plants, all the better if they were in time found to be more beautiful and larger than shown in the plate. And the public rarely saw the beauty of the drawings, owing to the drawbacks of even the best colour-printing, in which all the more delicate work of the artist is often injured.

In his work he took great pains to put the shoot in its natural attitude—studying that at first and then fixing his flowers securely, exactly in the way they were to be drawn. This, which seems the common-sense way, is not at all followed by students, who often begin anyway, and then try to arrange as they go.



The Late Henry G. Moon. (*Engraved for "Flora" from a photograph.*)

Like a poet or any other worker he had his moods,—what he called his landscape days, and his flower days. In the case of the flowers his grouping was simple and unique, and not to be found in the groups of any other flower-painter. He always painted one flower in each group as its focus or most important point, and the leaf-colouring was always studied from nature and not merely a conventional green. He never overcrowded his flowers like Fantin Latour, or over-coloured them like James Andrews and Walter Fitch. His outlines were of the slightest, often done with a brush dipped in local colour, or in the case of white flowers with a few lines and touches of apple-green. The grouping and outlining were indicated rather than completed, and the outlines were then finished with a full brush of the predominant colour. His powers as a pure colourist were remarkable, and depended on his knowledge and experience of wet colours, and the exact effects they would have when dry on the paper. To see him working seemed simplicity itself. The outline rightly suggested, the blot-colouring was laid in with a firm hand, and its drying watched and regulated with infinite patience, lightened by the touch of a damp brush here, or deepened with a touch of colour there, until the form and curl of the petals with their gloss and sheen, grew up before one's eyes. When the drawings had dried out, the finishing touches were given, the model flowers still before him, and the result always struck one as far ahead of what could have been expected from such apparently simple means. Being subtle alone in grouping, and simple in form and colour, his drawings lent themselves readily to most of the best methods of modern colour-printing.

His whole heart was in his work, and he worked almost to the last. I went to see him at St. Albans a few weeks before he died and found him in his studio, with two beautiful blottedout drawings before him, which he had just made from fresh blooms of new Lilies from Central China. Many of his landscape pictures in oil are exquisite. He was fond of Constable and Gainsborough, but the leaning towards any other artist is perhaps most suggestive of Córot at his best.

He used to laugh about "classing" artists into botanical and others, holding that Art was all the same in kind, and that given the clear eye and the trained hand, it was the same problem throughout. He never worked unless the light and all other conditions were favourable: I have seen far more constant toilers who did not mind so much about that. He never, as is so usual with artists, fell into a formula or a manner—seeing all things of the open air change every day, he sought them daily with fresh eyes. I have sat to Carolus Duran, now the worthy chief of the French Academy at Rome, but a portrait by Moon is the finer likeness. Anyone so unlike what we are accustomed to call a "botanical" artist it would be hard to find. His pictures of flowers were alive, and not the diagrams we often see. I remember Mr. Elliott of Pittsburg was with us one day, and Moon was drawing the Rose *Madame Charles*—the light and shade and colour were so true that we could hardly distinguish the drawing from the fine flower at its side.

I often thought that if less of his work had been given to plant-drawing, how much better it would have been for landscape art. Latterly he was working more at landscape—saying, how much more interesting work of this kind was than any other. Among his best things of recent years are pictures in Hunts, around St. Ives. His favourite places for sketching were the Norfolk Broads and the country all round East Bergholt, and parts of Essex.

In January 1894 he married Mr. Sander's only daughter, and made his home at St. Albans. He was most instructive as a critic and was frequently called upon to criticise at the London Sketching Clubs—"The Langham," "The Gilbert Garret," and others, and there are many young artists who owe him a debt of gratitude for his sure help.

Of simple and healthy habits of life, and even athletic in his activity, few men seemed more likely to enjoy a long life, when he was attacked by one of those "malignant" internal growths for which there is, alas, so far, no remedy. His strength had been lessening for a long time before the cause was made clear, and nothing could be done by operation or otherwise to save a life so precious to us all.

W. R.

THE MULBERRY.

ONCE common in gardens throughout the south of Britain, the Mulberry is seldom planted now, though rapid of growth while young, wholesome and abundant in fruit, and picturesque in age. The beauty of old Mulberry trees is seen here and there in time-worn gardens up and down the country, where gnarled old trunks still "bring forth fruit in old age." Even when forced to their knees the prostrate branches, rooting as they lie, renew the fight with a stout heart. There is something in this determination to die hard which appeals to a tree lover, as he stands before the old trees at Syon House or Hogarth's garden at Chiswick, or those in the Chapter garden at Canterbury and the Dean's garden, Winchester.

The first trees were brought to this country by the monks, one still standing at Syon and supposed to be the oldest in the country, having been planted while the house was a monastery. James the First spent largely in planting Mulberries near his palace, and, with the hope of setting up the silk industry in Britain, he gave seed to any who would rear the trees. Old records tell how a certain French noble sold 100,000 trees to English planters in 1609, but the silk-culture never prospered this side the Channel, and slowly the trees fell into neglect and have succumbed in times of cold, such as the winter of 1860-61, which killed many an old Mulberry tree. There is something in the Mulberry suggestive of the days now gone for ever,—my lady's bower ; the cloister walk ; the hush of some great fane where the head is bared, and the voice sinks to a whisper ; the fervid glow of dreamy noontide when Nature draws her myriad toilers to her quiet places, murmuring " be still, my child." But these are foibles of the past. The world has time neither to dream, or meditate, or even rest. The hush and quietude have gone amid a bustle where place is given to him who shouts the loudest, where that which is "boomed" is all in all, and chivalry, and reverence, and the hush which hears the things alone worth hearing, have passed away. And the Mulberry has gone too, save from such byways and backwaters of modern life where a little of the hush yet lingers.

It may be urged that with us the tree is not seen as it is in warmer climes, where its dense crown yields grateful shade and the branches are never riven by frost or borne down by snow, as sometimes happens here. But though we cannot show such beautiful old avenues as may be seen in ancient gardens and monasteries of the sunny south, yet there are individual trees of finer growth in northern Europe with its extremes of temperature, than are common in the south, where during centuries they have been enfeebled by unnatural loss of leaf. With us the Mulberry has had scant care for generations past, and the hardy Russian and the improved American kinds are still almost unknown among us. Such kinds as *nervosa* are beautiful and unlike anything else, while a little group of Mulberries upon a lawn makes a shelter proof against the fiercest heat, though little will thrive in their deep shade. The Russian Mulberry, so hardy and enduring in the worst soils and most exposed positions, makes an excellent hedge, and tiny dwarf forms such as *Morus Fegyvernekiana* are pretty in the rock-garden. Most young Mulberries need protection until well established, and sometimes suffer even then in hard winters, but new wood soon replaces such soft shoots as are destroyed, and wounds are covered with surprising rapidity. A merit of the Mulberry is its indifference to the smoke of cities. Until recently many old trees grew in London, fruiting freely under the worst conditions.

Though many Mulberries have been described as species, careful study has reduced the number to six or seven, the other hundred or so ranking as forms of these. The Black Mulberry (*Morus nigra*) is the best known in this country, and nearly all the old trees are of this kind. It grows well over a great part of England and Ireland, but only thrives in sheltered places or against warm walls in Scotland. It grows best in the moist rich soil of river-valleys, though trees will grow almost anywhere if the land is well drained and not too cold and heavy. Young trees three or four years old should be selected for planting in October or November, their thick fleshy roots being laid out carefully without shortening, and the tall stems of standards swathed in hay-bands to keep them moist until established. For a while young trees grow rapidly, though as they begin to fruit freely (mostly after six or seven years) growth becomes slow, and insensibly the tree assumes its spreading mature form. It sometimes happens in rich or manured soils that this luxuriant growth continues and the tree remains unfruitful ; root-pruning or other means of restriction will often correct this when the trees are of a good stock, though there are sterile forms which no amount of care will induce to fruit. No pruning is required beyond thinning, the natural form of the tree being freely branched and spreading. Much water is needed, especially while the fruit is swelling, and for want of this, trees that bear heavily will often cast their fruit in a dry season. The same thing happens when conditions are against complete fertilisation while the trees are in flower, the seed and pollen flowers being present in the same tree but apart, and whereas the male flowers soon wither and fall, the fertile flowers become fleshy and swell into fruit. These greenish-white flowers appear in June as little drooping catkins, coming with the leaves which are late in unfolding, their appearance being accepted as a sign that summer has indeed come. The leaves vary endlessly as to shape, size, and texture, according to variety and often upon the same tree, but in the common form they are large and mostly heart-shaped, with five blunt lobes, an irregularly toothed margin, and a rough surface. Only the finer-leaved forms of the Mulberry are grown for silk-culture, the coarser leaves of many kinds causing disease and death among the worms by their excess of woody fibre. The tree is almost free from insect enemies, unless it be red-spider in a dry season, which quickly disfigures the foliage and causes its premature loss; copious watering is the best remedy for this. On the other hand it is subject to several forms of fungus.

Fruits. The fruits mature from July to October according to climate and the variety grown, the berries ripening later and becoming poorer in quality and quantity as one travels north. They drop when fully ripe and are soft and so full of juice as to be spoiled by the fall, unless its force is broken by grass or straw. It is therefore usual to plant the Mulberry on lawns, to which its way of growth is well suited, while the grass prevents undue luxuriance and gives a natural carpet. The berries change in colour from rosy-grey when first formed, to bright red, and deep black. Preserved either by themselves or with blackberries they are wholesome, distinct in flavour, but too glutinous for all tastes; they also give a pleasant piquancy to Apples and other fruit in tarts. The juice is sometimes made into a fruit syrup of value for weak throats. Mulberry wine is not often made now, even in the country, but was once common enough in households. The best use for the fruit, and in all ways the most wholesome, is eaten fully ripe and uncooked. The finest fruits are borne by trained wall trees, and though wall-space is mostly too precious to give to the Mulberry, beautiful old trees grow in this way in some of our old English and Scotch gardens. Birds of all sorts are fond of the fruit and will take it while still unripe, so that it is often necessary to protect the trees with netting. In the south of Europe, poultry and game thrive on the fallen fruits, and in America the coarser kinds are fed to swine, who eat them greedily, while horses and cattle are equally fond of the fallen leaves in autumn. The fruit of old trees is the best, and they bear freely to extreme old age. Many varieties selected for the excellence of their fruits are now grown, especially in the United States, and these good kinds should be worth a trial in this country.

Wood. The White Mulberry is of taller growth than the Persian or Black Mulberry, attaining an extreme height of 40 to 50 feet with a trunk measurement of 10 feet, and pale grey bark deepening in colour and becoming knotted and irregular with age. The wood of old trees is short-grained and brittle, but at its best it is valued where other trees are scarce, as in southern Russia and parts of Asia Minor and Western America. The mature wood is pale orange-colour while fresh and red-brown when fully seasoned, and in structure and properties it is almost like that of the Robinia. It is hard, straight-grained, durable, proof against moisture, very thin in the sapwood and capable of high polish. In France it is used for making ladders, trellis-work, the small wooden pins used in shipbuilding and such-like sundries. Used for small wine barrels it is said to impart a peculiar flavour and a scent of violets to the wine. The value of the leaves for silk-culture in France is estimated at £400,000 yearly. A stout cord is spun from the fibres of the soft inner bark, and a yellow dye is drawn from the roots. The Red Mulberry of America is said to resist water as well as the best Oak, and for this reason it is used in shipbuilding and for cooperage.

Increase. There are several ways of propagating the Mulberry, and few trees are more readily increased. Seeds washed clean and sown in gentle heat, or in the open early in the year, will produce young seedlings by the autumn. Layers made in the autumn will root in a twelvemonth, and cuttings of the young wood with a heel, planted deep in a shady border late in the year, will root slowly, or more quickly and surely if put in gentle heat under glass. Root-cuttings will also prosper, but suckers which are occasionally thrown up are commonly sterile and fit for grafting only. Large branches many feet in length will also root if planted deeply in the autumn and firmly staked. Instances have occurred in which pieces of the main trunk and branches of an old tree sawn into lengths for fuel, have rooted as an avenue of young trees when planted in good moist soil. The base of an old tree placed in the yard of an inn as a mounting-block, surprised its owner by taking a new lease of life and growing rapidly into a stout young tree. It frequently happens—as with the old tree at Syon—that when thrown down by wind or snow, a tree starts afresh in the same way, making new roots and stems while the old trunk moulders away. For choice varieties of the White and Black Mulberry, budding and grafting are common means of increase, using seedling plants of the hardy Russian Mulberry (*M. alba tatarica*) as a stock, and retarded buds as scions. The seedlings are grown until nearly large enough, and are then cut to the ground to force tall straight shoots from the base fit for working as standards. Cuttings of *M. multicaulis* or any other kinds for grafting, should also be treated in this way. Good ever-bearing kinds may be budded or grafted upon these, *budding* as the sap rises in spring, and *grafting* later in the season. Some growers pot a quantity of stocks and graft under glass during the winter, employing root or crown grafts according to circumstance.

Kinds.

The White Mulberry (*Morus alba*).—Doubt exists as to the source of this tree, and the difficulty is increased by the fact that nearly thirty forms are referred to this species. It is supposed to have come from the far East, where forms of it have been grown for thousands of years to produce silk, for which its finer-leaved varieties are specially adapted. Though common and partly naturalised in the south of Europe, it is less frequent with us, being more tender and averse to a wet soil and climate than the Black Mulberry. Though faster in growth and larger in size, it is less enduring than that kind, with more erect shoots and a smoother and lighter coloured bark. The leaves are mostly smaller, smoother, more deeply toothed, and more succulent, containing much glutinous matter which gives tenacity and substance to the thread of the worms. In Europe the fruit of this tree is of little account, but in the United States some of the best fruiting varieties have been raised from *Morus alba* and the distinction between the white and black kinds nearly lost as regards the colour of their fruits, which vary from yellowish-white specked more or less with black to rosy forms and others almost as dark as any forms of *nigra*.

The Mexican Mulberry (*M. celtidifolia*).—A much smaller tree than the American Mulberry, rarely exceeding 25 feet in height, with smaller and smoother leaves and small black fruit, which ripens early and is very sour.

The Japanese Mulberry (*M. japonica*).—A new kind from N. China, Korea, and Japan, of stronger growth than the White Mulberry, though some see in it only a form of that most variable species. The leaves are large and drawn out to a long point, thin in texture, dull green, coarsely toothed, and deeply lobed to one side upon the young shoots, as in the American Mulberry. The fruit is bluntly oblong and red. Young trees are at first somewhat tender, but grow so strongly when established that the plant is being tried as a stock in the United States.

The Chinese Mulberry (*M. multicaulis*).—The leaves of this kind are valued next to those of the White Mulberry for silk-culture, indeed it is grown everywhere in China for this purpose and is sometimes preferred elsewhere for its great vitality and abundant leafage, which also comes a little earlier. It is a strong grower, throwing many stout erect shoots from its spreading crown, thickly covered with large long-pointed leaves which are very seldom lobed, and with sweet black fruit of fair quality. When first introduced into America it was so exploited that it became the object of foolish speculation, but is now little grown save as a stock. The famous Downing Mulberry is said to be a form of this species, but the Americans themselves are not clear upon the point.

The Black Mulberry (*M. nigra*).—Our

article mainly deals with this, the best known of the species, so little further need be said of it here. Cultivated for thousands of years past, its native country was long uncertain, though now believed to be Persia and the region of the Euphrates. Many cultivated forms have arisen differing in hardiness, value, and in minor details. The Black Mulberry, used to some extent in silk culture, is less valued for its leaves than for its fruit, which is consumed in large quantities in parts of Europe and Asia. Trees of 40 feet or more exist in favoured spots, but 20 to 30 feet is the average height, their tendency being to spread.

The American Mulberry (*M. rubra*).—The tallest of the Mulberries, often reaching 70 feet with a trunk diameter of 3 to 4 feet. It is a rapid grower, densely leafy, with large leaves very variable in outline, rough-surfaced above and softly downy beneath, those on the young shoots being strangely lobed on one side. The leaves are worthless for silkworms and save in selected forms the fruit is of little value, though very variable even in the wild trees which grow on rich bottom lands throughout the northern United States, and especially around Lake Erie and Niagara. The wood of the Red Mulberry is used for shipbuilding, posts, and light woodwork for outdoor uses, being durable in contact with the soil. There are several forms of it selected for their fruits, such as *Hicks'*, *Johnson's*, and *Stubbs'*, this being the freest though all are heavy croppers, with deep-black fruits of good flavour. The Lampasas Mulberry is also a selection of *M. rubra*, but is less hardy and its fruits not so good. *M. tomentosa* is a form of *rubra* with leaves glossy and rough above, whitish and of velvety softness underneath.

The Russian Mulberry (*M. alba tatarica*).—This is now classed as one of the many forms of the White Mulberry, but it is distinct in character. Coming from the arid plains of the Volga it is very hardy and does better than any other kind in poor dry soils and exposed places. It makes a low bushy tree which may nevertheless reach 40 feet, and like *M. multicaulis* throws a great quantity of stout erect shoots from the spreading crown. The leaf is very variable but in the main small, much lobed, and sometimes finely cut. The fruit is mostly small and insipid though very variable in size, colour, and quality, large-fruited plants (which often occur in a batch of seedlings) sometimes producing berries of fair quality. The trees are easily raised from seed and grow fast for awhile, will stand cutting to any extent, and are so indifferent to drought, cold, and exposure, that, in the most inhospitable regions of central Russia and the western United States, this little tree is prized for fences and wind-breaks. The Victoria Mulberry is a Texan selection of this tree, recommended for its fine black fruits.

Garden Forms.

Among trees so variable as is the Mulberry in all its forms, there are many kinds of garden value. For their fruits there are the selections of American raisers—the New American, the Thorburn, and the Trowbridge, in dark fruits; and Ramsey's White, a Texan tree which fruits very young. The Black Persian and Black Spanish forms of *M. nigra* are of good quality but tender. The Downing Mulberry is of difficult increase and is now seldom found true; its leaves and fruits are large, the berries jet-black and of the best quality, with a long season and trees that bear early. Distinct in growth is *M. constantinopolitana*, a neat lawn tree of 10 to 12 feet, with sturdy branches upon which the glossy heart-shaped leaves are densely clustered. There is also a pyramidal form; a form known as *Italia*, with very large much-cut leaves; and *M. Fegyvernekiana*, a miniature tree only 2 feet high. *Morus nervosa*, its narrow and jagged leaves netted with prominent white veins, is handsome and distinct, a good grower with small fruits. But quite the most remarkable of garden forms is the Weeping Mulberry, which originated in America some twenty years ago as a chance seedling of the hardy Russian kind, and is one of the best weeping trees for small gardens. Fully hardy, vigorous, and graceful, it forms a perfect umbrella-head whose slender branches droop to the ground, bearing small black fruits of agreeable flavour, which ripen in July. A golden-leaved form of *M. rubra* is sometimes seen in American gardens, while in such parts of central Europe as are exposed to severe cold, a dwarf Mulberry known as *Morus fakiva* is grown for its great endurance. B.

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